NETWORK WORLD

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

AN INTERNATIONAL DATA GROUP PUBLICATION ♦ VOLUME 10, NUMBER 42 ♦ OCTOBER 18, 1993

SPECTRUM SWAPPING

Microwave users play 'let's make a deal'

Inside:

- Wireless special issue: Page 39
- PCS interoperability concerns: Page 62
- Spectrum battle: Page 62

BY ELLEN MESSMER

Washington, D.C.

While would-be providers of personal communications services (PCS) have yet to make a dime, some microwave users facing eviction from the airwaves allocated to PCS are ready to reap a windfall.

The Federal Communications Commission has opened up spectrum in the 2-GHz range for wireless PCS, but carriers that win licenses in the FCC's spectrum auctions next spring will have to pay all expenses — including the cost of new equipment — to move incumbent microwave users to the new frequencies.

That's leading to a flurry of negotiations among prospective PCS providers and some users that have already resulted in promises of millions of dollars in free equipment and network design and installation services.

"In New York, there are 38 [microwave] links in the 1850-MHz to 1990-MHz band, and I've personally spoken to [the owners of] all of them," said Steve Curtain, vice

See **Microwave**, *page 62*

Cable, telco worlds collide in Bell Atlantic/TCI merger

Multibillion-dollar deal may reshape the telecom landscape.

BY BILL BURCH

Washington, D.C.

Last week's gargantuan merger of Bell Atlantic Corp. and CATV operator Tele-Communications, Inc. (TCI) could fundamentally restructure the telecommunications industry and provide the critical mass of users needed for an explosion in interactive multimedia services.

As a result of the $20 billion merger, Bell Atlantic will have new justification for investing in broadband facilities to support advanced services and will gain access to TCI cable television customers throughout the country. That will also move the carrier one step closer to providing long-distance services should the Consent Decree restriction be lifted.

The deal will give Bell Atlantic access to the cable company's programming expertise and its 30% stake in competitive access provider Teleport Communications Group, Inc., the balance of which is owned by three other cable companies.

For the business user, the deal appears to hold few immediate changes (see story, below). But according to Rob Rich, an analyst with Dataquest, Inc., a research firm in San Jose, Calif., Bell Atlantic will ultimately use TCI's presence in far-flung territories to launch new voice and data services.

"There's going to be another well-managed, high-capacity network out there in the local exchange," Rich said.

See **Merger**, *page 8*

Thumbnail of a $20 billion merger

Bell Atlantic 12 million residential and 6 million business/government users

TCI 1,217 cable systems serving more than 13 million subscribers

Together Presence in 59 of the top 100 U.S. markets

Goal Build broadband networks for interactive entertainment, education and other services

While the consequences of the $20 billion merger of Bell Atlantic Corp. and CATV giant Tele-Communications, Inc. (TCI) will not be felt for a long time, there is heated debate among users about whether the end result will be good or bad for the industry.

While other carriers are content with purchasing portions of media companies to secure programming for interactive broadband networks, Bell Atlantic and TCI said they will tightly integrate their operations.

"This combination will be a model for communications companies in the next century," said Bell Atlantic Chairman Raymond Smith.

The alliance would merge all operations of the two companies, except for TCI's cable systems in the Bell Atlantic region. Under the terms of the 1984 Cable Act, Bell Atlantic

See **Debate**, *page 61*

IBM off-loading OSI apps

BY MICHAEL COONEY

Boston

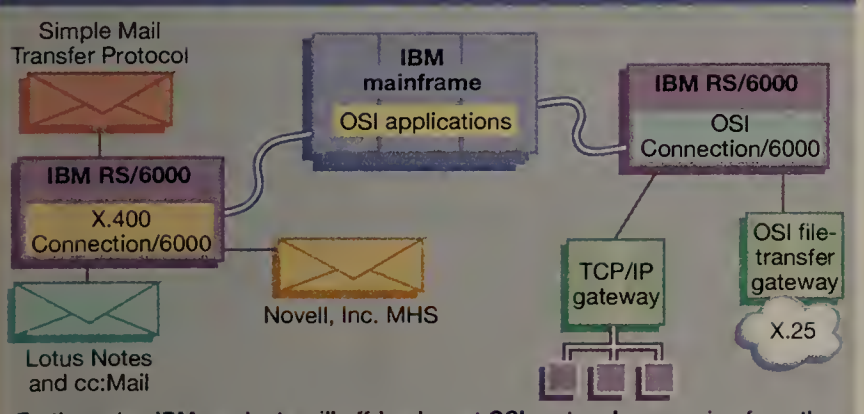
Even as OSI's star is quietly fading, IBM is working on new Open Systems Interconnection applications that it hopes will bolster its open systems strategy and give users a fresh reason to examine OSI.

According to sources close to IBM, the company will offer for its RISC System/6000 platform the two most popular OSI applications — cross-platform file transfer and X.400 messaging. The products are expected to off-load processing chores from the mainframe and be more affordable than IBM's host-based OSI software.

Both OSI Connection/6000 and X.400 Connection/6000 will exploit the off-load technology IBM uses in its TCP/IP Offload facility for the 3172 Interconnect Controller local-

See **OSI**, *page 10*

IBM downsizes OSI applications



Forthcoming IBM products will off-load most OSI protocol processing from the mainframe to the RS/6000, enabling users to build E-mail backbones and gain multivendor connectivity at far less cost than existing IBM products.

GRAPHIC BY SUSAN SLATER SOURCE: *NETWORK WORLD*

United flies to custom ACD net

BY BOB WALLACE

Chicago

United Air Lines, Inc. last week detailed plans to replace its nationwide automatic call distributor (ACD) network with a custom AT&T service and equipment package that may eventually be offered to all users.

The innovative offering promises to save United money by enabling it to get rid of the ACDs at its eight reservation centers, ditch the T-1s that tie them to its headquarters here and reduce its agent head-count — all without affecting customer service.

"[The offering] will let us operate as if all our agents are under the same roof," said Bob Camastro, United's manager of reservation planning and development. "The AT&T network will route each incoming call to the next available agent, regardless of location."

United's 5,500 sales agents field 85 million calls a year from customers and travel agents that want flight information and tickets. On average,

See **United**, *page 8*

New NetWare release to ease directory mgmt.

BY CARYN GILLOOLY AND CHRISTINE BURNS

Provo, Utah

Novell, Inc. is readying yet another version in its NetWare 4.X line, this one primarily designed to improve directory service capabilities.

According to sources briefed by the company, NetWare 4.1 will be released in the first quarter of next year and will include tools to help administrators trim directory trees, merge trees and move branches within the 4.X NetWare Directory Service (NDS).

In the first quarter of 1994, Novell is also expected to release in conjunction with Preferred Systems, Inc. a tool that will help users more easily migrate from 3.X to 4.X environments by building directories off-line, making it possible to experiment with moves and changes.

Although some users expected this version of NetWare to be the processor-independent version Novell has promised, that release will not appear for a while.

"I don't think there are any showstoppers in [the new 4.1 version], but it certainly is not merely a bug fix, either," said one user briefed by Novell. "You could fairly call it a new features release."

The user added that NetWare 4.1 will only be the first of several NetWare 4.X releases Novell has planned. "It is reasonable to assume, based on other things Novell said, that you should expect to see a 4.2

See **NetWare**, *page 5*

NEWSPAPER

Briefs

IBM ready to roll. As expected, IBM this week will announce a series of new and improved networking products. First up will be enhancements for the 3745 front-end processor, including a new version of its Network Control Program that provides improved support for Transmission Control Protocol/Internet Protocol, frame relay and Advanced Peer-to-Peer Networking (*NW*, Sept. 20, page 1). Next, IBM will roll out new high- and low-end models of its 8250 LAN hub with routing and improved 3270 support (*NW*, Oct. 4, page 1). Also expected is a low-end 973X Integrated Digital Network Exchange (IDNX) T-1 multiplexer and the announcement of additional vendors that will support IBM's AnyNet multiprotocol networking software.

Working the numbers. With Bell Communications Research bowing out as administrator of the North American Numbering Plan, the Alliance for Telecommunications Industry Solutions next week begins a series of week-long meetings on numbering issues. The Industry Numbering Committee meets Oct. 25-29 in Phoenix to discuss interchangeable area codes, Switched Multimegabit Data Service and the future of numbering. The committee's second meeting, in Washington, D.C. on Dec. 6 -10, will cover number portability and personal communications services. Additional meetings will be held Jan. 31 - Feb. 4 in San Diego and Feb. 28 - March 4 in Orlando, Fla. For more information, call (202) 628-6380.

DEC rethinks Polycenter pricing. In response to customer demands for simplified software licensing, Digital Equipment Corp. has implemented a flat pricing structure for its Polycenter network and systems management products. Each Polycenter application now has a single price, regardless of the VAX processor it runs on. For example, the Polycenter Storage Library System used to range in price from $1,820 for a MicroVAX 3100 to $12,200 for a VAX 7000 Model 610. The software now costs $10,000 for all VAX systems. Also, DEC said it lowered prices of Polycenter client software to spur customer deployment.

A thrifty deal. Thrifty Corp., a California-based drug store chain, has outsourced its data communications network to Scientific-Atlanta, Inc. to the tune of $10 million. For the next five years, Scientific-Atlanta will operate and manage Thrifty's very small aperture terminal satellite network and T-1 leased-line net. The network links 650 sites in the western U.S., including 500 stores in California.

Smashing records. Chipcom Corp. last week marked its 10th consecutive quarter of record revenues with a total of $39.4 million for the third quarter ended Sept. 25, which is a 61% increase over the same period last year. Net income increased by 78% to $3.9 million. Rival SynOptics Communications, Inc., meanwhile, announced revenue of $183.3 million in its third quarter, a 70% increase from the same period in 1992. Net income was $5.7 million and included a onetime charge in connection with the acquisition of Coral Network Corp.

Answering the challenge. Addressing one of the biggest knocks against the proposed 100Base-T Ethernet standard, Standard Microsystems Corp. last week proposed a signaling scheme that would allow the 100M bit/sec Ethernet standard to work with Category 3, 4 and 5 unshielded twisted-pair wiring. The scheme, which uses three pairs of wire to transmit 33M bit/sec of data each and a fourth pair to detect collisions, extends the current Ethernet standard's support for Category 5 wiring to the other copper-based cable types, most importantly Category 3, which claims a large installed base.

Contacts

ADDRESS: Network World, 161 Worcester Rd., Framingham, MA 01701. PHONE: (508) 875-6400; FAX: (508) 820-3467; INTERNET: network@world.std.com.; BBS: Interact with other readers: download free software, submit letters to the editor, leave news tips, change of address requests or hunt for jobs by using your IBM, Apple or other computer to dial into the BBS at 300 to 2,400 bit/sec (8N1) at (508) 620-1160 or at speeds up to 9.6K bit/sec by dialing (508) 620-1178. READER ADVOCACY FORCE (R.A.F.) HOTLINE: Contact us with story tips about pressing user issues, (800) 622-1108, Ext. 487; NETWORK HELP DESK: Contact Susan Collins via any of the above means.

Network HELP desk

Network World *tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Susan Collins at (800) 622-1108, via fax at (508) 820-3467 or via the Internet at scollins@world.std.com.*

Can you recommend any home study materials for less than $1,000 that will prepare me for Novell, Inc.'s Certified NetWare Administrator (CNA) exam?

Jerry Amancio, Windsor, Conn.

Carl Reid, computer systems analyst and director of NetTECH SYSTEMS, a Jersey City, N.J.-based computer consulting company, replies:

There are several inexpensive options for home study preparation for the CNA exam. However, you should keep in mind that this method of study requires that you already have a solid understanding of DOS and microcomputers in order to grasp the NetWare concepts.

First, you must choose the NetWare version for your certification — either 2.2 or 3.11 — and study for the corresponding exam. (Test #50-116 is for the Certified NetWare 3.11 Administrator and Test #50-115 is for the Certified NetWare 2.2 Administrator.)

Next, I recommend taking Novell's NetWare 3.11 to 2.2 Test Topics course (Course #5012), which costs $295. This one-day course reviews the topics that will be on the CNA exam and will help you determine exactly what you need to study. You can take this course at any Novell Authorized Education Center.

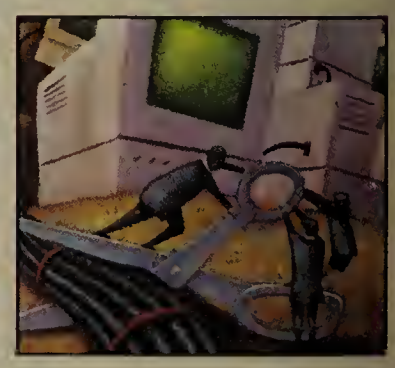
Once you know the CNA test topics, you can begin your home study program. I recommend that you purchase the NetWare Server Troubleshooting and Maintenance Handbook, *by Edward Liebing and Ken Neff for $35. This book covers many of the topics you need to know. McGraw-Hill, Inc. also offers a wide selection of NetWare books that you may find helpful.*

When you feel that you are ready to take the test, call Drake Training & Technology, Inc. at (800) 733-3926 to register.

Ronald Nutter, escalation manager of 900 Support, a 24-hour, seven-day per week NetWare technical support company in Lake Oswego, Ore., adds:

See **Help desk**, *page 52*

CONTENTS



TYPICAL SOLUTIONS WOULD BE FINE IF EVERYONE WERE TYPICAL.

No other business is like yours. That's why we design ***Sprint's custom 800 service*** *specifically around your needs.*

For instance, a national business services provider needed to give customers information on its 600 locations—without operators or capital investment. Sprint's solution combined its 800 Locator Service with its unique integrated fax capability. This system allows callers to hear an automated voice response, speak to a dealer directly, or even receive a location map by fax.

Sprint was the first carrier capable of providing this integrated solution. And Sprint can create a reliable, customized solution that's ideal for your company, too. After all, your business is one of a kind. Then again, so is ours. For more information on Sprint's 800 service, ***call 1-800-827-4800.***

Sprint.

Be there now.

MIDDLEWARE

Horizon, Momentum announce merger

BY WAYNE ECKERSON

Needham, Mass.

Middleware rivals Horizon Technologies, Inc. and Momentum Software Corp. this week will announce that they've merged into a single company that will provide message-oriented middleware (MOM) products addressing both local- and wide-area net requirements.

The new company, which will go by Momentum's name, will pose a formidable challenge to other companies that offer MOM products, including IBM, Digital Equipment Corp. and Covia Technologies, Inc.

MOM provides developers with a simple, reliable way to connect disparate applications that use different operating systems and network protocols.

The merger brings together two companies with complementary technologies. Horizon provides middleware to connect applications running on mostly IBM machines across WANs using IBM Systems Network Architecture protocols. In contrast, Momentum has focused on providing high-speed, local-area connectivity among applications running on different vendors' Unix machines.

Each company was facing an 18- to 24-month development period to extend its products into the other's area of strength. The merger almost immediately shores up the weaknesses in each company's product line and allows them to accelerate work on projects that previously would have had to wait until the platform ports were complete.

Together, the companies will be able to offer a single, simple application program interface (API) that will enable developers to link applications running on 22 platforms using eight network protocols (see graphic, this page). This rivals the platform support offered by other leading MOM vendors.

VANDERVOORT

More importantly, the two companies can now offer users an end-to-end middleware solution that supports both local- and wide-area connectivity.

Momentum's Extended Interprocess Communications (XIPC) product extends Unix operating systems functions of shared memory, semaphores and queues across high-speed LANs.

Horizon's Message Express, on the other hand, provides guaranteed delivery of interprocess messages across wide-area connections.

"There is nice synergy here. Horizon can use XIPC to gain access to LAN platforms, and XIPC can use Horizon to send stuff over the wide area," said John Rymer, vice president at Patricia Seybold Group, Inc. in Boston, who had been briefed on the merger.

Jeff Springborn, senior consultant at Anderson Consulting in Phoenix, said the merger will create a more versatile tool for interconnecting applications in client/server environments.

"They are no longer just niche players," said Springborn, who has used Horizon's Message Express to integrate several clients' computing environments.

The merger also gives the two companies, which were operating at break-even cash flow levels, a little more breathing room. Momentum recently received $2.7 million in venture capital, which will be used to fund the new operation.

INTEGRATION TIMETABLE

The companies plan to integrate their products in three phases.

The first phase, to be completed by the first quarter of next year, will involve the construction of a bridge between XIPC and Message Express.

By the second quarter of 1994, Momentum will have integrated the two products' APIs. The XIPC API, which consists of 80 calls, will be layered underneath the Message Express API, which consists of four calls. However, developers will have the option to program directly to the XIPC API if they need greater control over the messaging environment.

Phase 3, which will kick off during the latter part of 1994, will involve more thoroughly integrating the two products' configuration management and monitoring capabilities.

As part of that plan, Message Express' Flight Console management capability will be consolidated within XIPC's distributed debugger utility, which is one of XIPC's strongest features.

✆Momentum: (617) 444-7575.

Gaining momentum

Momentum Software Corp.'s postmerger middleware product will support the following operating systems and network protocols:

Operating systems

- MVS/CICS
- MVS/VTAM
- DOS-VSE/CICS
- DOS-VSE/VTAM
- OS/400
- VAX/VMS
- NetWare
- LAN Server
- LAN Manager
- AIX
- HP/UX
- Solaris
- DG/UX
- Unix System V Release 4
- SCO UNIX
- 386/ix
- MIPS
- Sequent Dynix/ptx
- OS/2
- DOS/Windows
- Macintosh

Protocols

- APPC/LU 6.2
- CPIC
- TCP/IP
- SPX/IPX
- DECnet
- X.25
- NETBIOS
- Named Pipes

GRAPHIC BY TERRI MITCHELL

THE LINEUP

Former Momentum Software Corp. President Jeff Arnold is chairman of the combined companies. Horizon Technologies, Inc. President Hub Vandervoort is Momentum's vice president of marketing. Larry Duckworth, previously CEO of Intercomputer Communications Corp., will become president and CEO of the new Momentum.

WilTel details frame relay bursting enhancement

BY BOB WALLACE

Tulsa, Okla.

Following AT&T's lead, WilTel this week is expected to announce an enhancement to its WilPak frame relay service that will allow users to exceed the capacity they have paid for on their frame relay networks for sustained periods.

The enhancement, called Maximum Sustained Transmission Rate (MSTR), takes advantage of software designed by StrataCom, Inc. for its Internetwork Packet Exchange (IPX) T-1 multiplexers. The software enables users to burst above their committed information rate (CIR) — the minimum guaranteed bandwidth between nodes in a frame relay network — as long as excess capacity is available on the carrier network.

WilTel uses the fast packet IPX switches to deliver frame relay service.

WilTel's MSTR gives the user control over the StrataCom feature, which is something WilPak users demanded. With MSTR, which is available at no cost, a customer can determine just how much above the CIR to burst traffic, with the realization that excess traffic could be discarded if the carrier network becomes congested.

"For network managers, this is an extremely important control issue," said Christine Heckart, WilTel's manager for broadband services. "As more mission-critical applications are added to frame relay nets, network managers will demand control over this important parameter."

AT&T is now offering the ability to sustain bursts above users' CIR networkwide (*NW*, Oct. 11, page 1). WilTel began offering MSTR to new WilPak users earlier this month and will offer it to all existing customers by year end.

WilPak users can select a CIR of 16K, 32K, 48K, 56K or any increment of 64K bit/sec up to 1.024M bit/sec. With MSTR, WilTel marks frames that are sent in bandwidth above the user's CIR as discard-eligible, meaning they will be dropped if a link in the frame relay net is congested.

Choosing whether to exceed the CIR depends on the type of application supported by the frame relay network. Users with applications requiring a very high level of service predictability would likely opt not to burst over the CIR so that no data would be tagged as disposable.

Applications with less stringent performance requirements could take advantage of excess capacity on the carrier net.

Like AT&T, WilTel does not charge users for the frame relay enhancement. Customers can establish CIR and use of MSTR by calling WilTel or mailing them information.

✆WilTel: (918) 588-3210.

Microcom modem may ignite V.fast price war

BY JIM DUFFY

Norwood, Mass.

Microcom, Inc. last week unveiled proprietary V.fast modems that could set off a price war and spur a technological redesign in the nascent V.fast market.

The firm brought out two V.fast devices: a desktop modem, called the DeskPorte FAST, and a portable model, called the TravelPorte FAST. Both are priced at $499 and can attach to the parallel port on a personal computer, a capability intended to bypass the throughput limitations of serial attachments.

The CCITT V.fast standard, which is still in the draft stage, specifies speeds of 28.8K bit/sec and, via compression, 115.2K bit/sec over dial-up lines. Currently, the CCITT V.32bis rate of 14.4K bit/sec is the highest standard-compliant speed, and V.32bis devices are priced from $199 to $399.

V.fast is expected to be finalized in mid-1994 with standard-compliant products to follow soon after. In the meantime, vendors are developing 28.8K bit/sec modems with proprietary modulation schemes to accommodate users seeking high speed lines.

At $499, the Microcom modems could accelerate price wars in the V.fast market. Other proprietary V.fast modems, such as Motorola Codex's 326XFAST line, are priced above $1,000.

"We see this as a bold move," said industry analyst Lisa Pelgrim of Dataquest, Inc. in San Jose, Calif. "That's a very low price for V.fast. It's in line with some of the prices for V.32bis devices."

Some vendors, such as AT&T Paradyne, are also proposing V.32terbo as an interim step to V.fast. V.32terbo is a V.32bis compliant modulation scheme that supports data rates up to 19.2K bit/sec.

"Where does V.32terbo fit in now with a $499 price for V.fast?" asked Greg Tompkins, Microcom director of product planning and marketing for modems. "I think it gets compressed out of the way."

Dataquest's Pelgrim said she believes V.32terbo vendors will reassess their pricing to protect market share in light of the Microcom announcement.

She also said the ability to attach the Microcom modems to a PC's parallel port will boost the appeal of the V.fast wares, especially for Windows users.

When attached to a serial port, throughput between modems is limited to 19.2K bit/sec, due to the limited size of most PC Universal Asynchronous Receiver/Transmitter (UART) buffers. When data is received, the UART issues an interrupt signal, which DOS reponds to immediately by moving data into memory.

But Windows does not respond immediately to the UART's interrupt signal because it has to switch the CPU from protected memory mode to real memory mode each time data is moved into memory. This results in a loss of characters because Windows cannot switch between modes fast enough to keep up with data coming into the PC at 9.6K bit/sec.

A parallel attachment, on the other hand, provides a 500K bit/sec link between the PC and modem because the parallel port receives data 8 bits at a time to a serial port's 1. Also, Microcom's Windows driver software transfers packets in 64-character bursts between the modem and PC, instead of just one with a serial connection. Transferring data in bursts means the PC's CPU spends less time servicing interrupt signals, Microcom said.

The DeskPorte FAST and TravelPorte FAST will be available later this month. Users can upgrade these modems to the V.fast standard for $39 by replacing a chip and downloading new firmware.

✆Microcom: (800) 822-8224.

DCA lets Mac users reach out with CrossTalk for Macintosh

BY CHRISTINE BURNS

Alpharetta, Ga.

Digital Communications Associates, Inc. last week released a version of its popular CrossTalk asynchronous communications software for Macintosh users.

CrossTalk for Macintosh, which complements versions for DOS and Windows-based personal computers, lets Apple Computer, Inc. Macintosh users open and run multiple communications sessions.

"Finally we have a useful way to tie our Macs to a network," said Joseph Nagy, chief of facility engineers at the U.S. Mint in Denver. He beta-tested the software on both a Macintosh PowerBook and a desktop Macintosh to connect to a local-area network as well as to four other systems running in U.S. Mint facilities across the country.

Nagy said the graphics capabilities of the Macintosh contribute greatly to his ability to do his job. However, since Nagy could not access information residing on host systems throughout the U.S. Mint's LAN and wide-area nets from the Macintosh, those capabilities sometimes went unused. "CrossTalk gives me the opportunity to do both at the same time," Nagy said.

CrossTalk for Macintosh lets a Macintosh emulate numerous terminals, including: Digital Equipment Corp.'s VT-320, -220, -102, -100 and -52; IBM's 3101; Hewlett-Packard Co.'s 700/94; Wyse Technology, Inc.'s 50, 50-plus and 60; TeleVideo Systems, Inc.'s 912, 920 and 925; and ANSI's PC terminals.

A built-in text editor allows users to compose messages from within CrossTalk while the Macintosh is emulating a terminal and communicating with a host.

Protocols supported include Xmodem, Ymodem, Zmodem, Kermit, CompuServe B-plus, and ASCII upload and download.

In addition, CrossTalk for Macintosh supports Apple's Comm Toolbox specification and terminal tools, meaning a PowerBook user could employ DEC's Local Area Transport protocol in conjunction with Apple's Express modem and AppleTalk Remote Access to connect to a VAX.

DCA also provides cross-platform compatibility between its DOS-, Windows- and Macintosh-based products to ensure that script and keyboard files can run between them.

Nancy Meachim, an analyst at International Data Corp., a Framingham, Mass., research firm, said the Apple Comm Toolbox support will be helpful for systems administrators who write scripts that enable end users to access network resources.

End users will be able to take advantage of the product's compatibility with the existing CrossTalk for Windows version.

"For people using Macs, it's going to be very helpful to be added to PC networks and then to have access to all the same resources and files the Windows users have," she said.

CrossTalk for Macintosh is available now for $195 per client. CrossTalk for Windows users can upgrade to the Macintosh version for $49 per client.

✆DCA: (800) 348-4000.

NetWare

Continued from page 1

and 4.3 coming out on 12-month schedules," he said, although he would not provide further details.

Novell would not comment on the release but did say the next release of NetWare 4.X will not be the processor-independent version.

TREE TRIMMING

Novell's NDS is the reason a majority, if not all, of current NetWare 4.X users upgraded to the higher end network operating system. But, according to these users, Novell still has quite a way to go with NDS before 4.X lives up to its enterprise stature.

"The problem with 4.01 is that it's too young and there aren't enough tools," especially with NDS, said John Shortall, 4.0 project leader at Air Canada in Montreal.

Specifically, NDS has not provided users with the flexibility necessary to manage an enterprisewide directory.

"If you have a reorganization within the company — if the sales department merges with the marketing department — the only way to change the directory is to delete users from one department and add them to another," said another user. "Today, there's no way to simply cut off a branch [of the directory tree] and add it to another part of the tree or to merge two trees."

According to sources, these problems have been impeding some companywide implementation plans but should be solved with NetWare 4.1.

The new version will include tools that will let administrators move branches of users from one tree to another with all security and access rights intact. And administrators will be able to merge two trees without having to reenter information.

"Today, there's no way to simply cut off a branch [of the directory tree] and add it on to another part of the tree or to merge two trees," a user commented.

Administration will be further eased with the new Preferred Systems tool. "This tool will let you ease migration by creating the directory structure off-line," said one user, who saw a preliminary demonstration of the product at NetWorld 93 Dallas.

Today, all NDS creation must be done on-line.

"This way, you can experiment, do moves and changes, off- line," the user said.

"This tool can definitely help you make the move to 4.X. I can even see companies waiting on its availability before upgrading [from 3.X]."

Start-ups readying database application development software

Forte to focus on partitioning applications across networks.

BY BOB BROWN

Two start-up companies — Forte Software, Inc. in Oakland, Calif., and Montage Software in Emeryville, Calif. — are expected to announce their respective application development and database products during the next several weeks.

Forte will announce Nov. 1 its Forte application development software, a product that will enable developers to build distributed applications without first having to decide how they will be partitioned across networked computers. The software is expected to be generally available next summer on a variety of platforms.

The Forte software will run on Windows, Apple Computer, Inc. Macintosh and Motif clients, as well as a variety of Unix servers, including those from Data General Corp., Digital Equipment Corp., Hewlett-Packard Co., Sequent Computers Systems, Inc. and Sun Microsystems, Inc.

It will support DEC, Oracle Corp. and Sybase, Inc. databases, plus network protocols such as the Transmission Control Protocol/Internet Protocol, AppleTalk, Novell, Inc. Internetwork Packet Exchange (IPX) and DECnet.

"I think this product will take client/server a little further than what people understand client/server to be [based on other tools out on the market]," Mann said.

Analysts compared Forte's software to Cooperative Solutions, Inc.'s Ellipse transaction processing application development tool. One major difference, though, is that Forte's product is designed to run on more platforms than Cooperative Solutions', which is primarily for OS/2 systems.

John Mann, an analyst at The Yankee Group, a Boston-based market research firm, said Forte should enable users to partition applications in different ways, depending on their resources.

For example, more application logic could be located on servers in sites where powerful servers are located, whereas more application logic could reside on clients where lighter weight servers are located, he said.

"I think this product will take client/server a little further than what people understand client/server to be [based on other tools out on the market]," Mann said.

Richard Finkelstein, president of Performance Computing, Inc., a consulting firm in Chicago, was more skeptical about Forte. He said Forte will be challenged to deliver a robust product given that it plans to support so many client/server platforms.

Details on pricing were unavailable.

MONTAGE

Montage, originally Miro Systems, will commercialize Postgres, a research database technology developed during the past six years at the University of California at Berkeley under the direction of Michael Stonebreaker.

Postgres builds on the technology upon which Stonebreaker worked and on which Ingres has based its database products.

According to Montage documents obtained by *Network World*, the Montage software will support three core functions: data management, object management and knowledge management.

Data management refers to the ability to handle relational data, such as information that can be stored in tables and rows. Object management allows for the storage and manipulation of nontraditonal data typtes, such as bitmaps, icons and new data types. Knowledge management will allow users to create a set of rules to enforce specific restrictions, such as version control and data integrity, among others.

Some observers compared the product to that of UniSQL, Inc., an Austin, Texas, vendor of an object/relational database system.

The database server component of Montage's software, which initially will run on at least Sun servers, will handle SQL parsing, data access and other functions. It will work with client-based applications developed with tools from either Montage or other vendors.

Montage is expected to announce a development tool it refers to as "a fifth-generation application builder." This tool is designed to let even nonprogrammers build applications without writing any code. Instead, the user draws arrows between icons representing various objects on a graphical user interface to create applications or what Montage refers to as "recipes."

In addition, Montage is expected to deliver a database browser, according to a user who tested the product.

Applications supported by Montage will include not only traditional relational database applications, but images, multimedia, document management, computer-aided design and others.

A spokeswoman for Uniface Corp., an Alameda, Calif., client/server development tool vendor, said users will be able to use Uniface's product to build front-end applications for the Montage database.

According to the Montage documents, the firm's software will be compatible with database products from IBM, Ingres, Oracle and Sybase. This will enable users to migrate from other databases to the Montage software in order to support more complex data.

Donald DePalma, an analyst at Forrester Research, Inc., a market research firm in Cambridge, Mass., said that both Montage and UniSQL "are ahead of the curve" in the database market. The big question is whether they have the staying power to last until market demand emerges for such products, he said.

According to Finkelstein, the current relational database products on the market "have an awful time trying to handle complex data, such as images, video, graphics and long text documents." Object-oriented databases are better equipped to handle a variety of complex data, he added.

Further details were unavailable on Montage.

✆Forte: (510) 834-1501; Montage: (510) 652-8000.

Senior Editor Peter Lisker contributed to this article.

IBM enhances information warehouse

BY PETER LISKER

White Plains, N.Y.

In a quiet series of briefings with press and analysts, IBM last week announced new components and enhancements to products in its Information Warehouse product family.

Information Warehouse is IBM's data management strategy for enabling users to easily find and access data stored in massive corporate databases.

Based on client/server technology running in combination with IBM mainframe databases, the offerings include the Dataguide family of products designed to provide an online catalog of information within an organization; and Copy Management products, which allow users to replicate and transfer information between IBM systems that participate in Information Warehouse.

"Dataguide is IBM's strategic offering to enhance our customers' ability to obtain critical information wherever it resides."

The Dataguide products consists of PC and mainframe MVS components.

Dataguide/2, based on OS/2 Version 2.1, provides a local-area network-based catalog for locating information within an organization. Designed to support Information Warehouse, it allows users in decision support applications to locate and utilize data that exists in IBM DB2 and IMS mainframe databases.

The product provides a graphical user interface (GUI) to the Dataguide/MVS host software and, according to IBM, features an easy-to-use tool for nontechnical users who need to access mainframe data.

For mainframe 3270 terminal users, Dataguide/MVS provides cataloging functionality through the IBM Common Data Facility/MVS (CDF/MVS). It is designed to give terminal-based users equivalent access to corporate data as is available to LAN-based personal computer clients.

Both Dataguide products represent IBM's nod to industry trends that place significant importance on obtaining and utilizing corporate data no matter where within the network the data resides.

"Dataguide is IBM's strategic offering to enhance our customers' ability to obtain critical information wherever it resides," said Thomas Aser, vice president of sales and marketing for IBM's Software Solutions division. "Dataguide is a fundamental component of our Information Warehouse strategy and will alleviate the need for a user to explicitly know where a crucial piece of data is located."

REPLICATION TOOLS

The new Copy Management replication products allow users to access, replicate, integrate and format enterprise data for use at client workstations. The one caveat: Today, the services only apply to data from IBM systems.

At the heart of the Copy Management facilities is the new Version 1 Release 2 of IBM's DataHub product. Data Hub is the IBM administrative tool designed for integrated copy management — IBM's term for replication and movement of data — between the mainframe and client/server environments.

The new release extends the system to include IBM's DB2/6000 product running on IBM RISC System/6000 systems. The DataHub administrative functions can also be used to work in tandem with IBM's newly announced FlowMark work flow management software and supports replication by timed events. A new release scheduled to be announced in the first half 1994 will include event-driven scheduling according to IBM.

The other components of Information Warehouse replication announced include:

- The DataPropagator Relational and Nonrelational products, which run on client PC workstations and provide a GUI to allow users to select and copy information in IBM DB2 and IMS databases to local and remote workstations. The products also allow users to obtain information from CICS for inclusion in the Information Warehouse environment.
- The DataRefresher, which can be used to refresh relational databases across a network from existing MVS applications.

ASER

Conspicuously absent from the IBM announcment was the ability to tap non-IBM datasources for use in the Information Warehouse. An IBM spokesperson said enhancements to allow non-IBM databases to participate in Information Warehouse will be available through third-party tools, such as Information Builders, Inc.'s EDA/SQL product, and IBM products within the coming year.

"The fact of the matter is what we're really dealing with is an architecture, which, though it certainly runs across IBM systems, must also include connectivity to non-IBM data sources," said George Schussel, CEO of Andover, Mass.-based Digital Consulting, Inc.

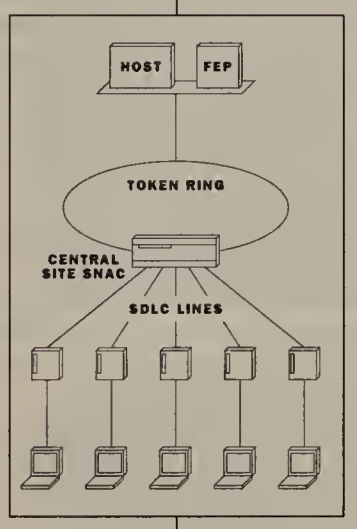
"I see a tremendous amount of interest in Information Warehouse among the Fortune 1000 companies, but it's essential that IBM improve their ability to integrate non-IBM source of information," Schussel said.

"IF I TELL YOU HOW MUCH MONEY SYNC'S CENTRAL SITE SNA CONVERSION SAVED ME AT [redacted], I'M DEAD MEAT."

Get the competitive tool companies would rather keep to themselves. The Central Site SNA Conversion Node (CS SNAC) lets you downsize or eliminate FEPs now, and painlessly open your SNA network, with a platform for the further evolution of internetworking. It's available only from Sync Research, the most trusted name in internetworking SNA.

"Once we saw the power of Sync, we told the reps from [redacted] and [redacted] to get lost."

Short-term, the CS SNAC offers potential savings of literally hundreds of thousands of dollars in reduced front-end processor costs. Longer term, by opening SNA, your huge SNA network investment can evolve gracefully, adopting key new technologies and standards like frame relay or APPN as they become appropriate.



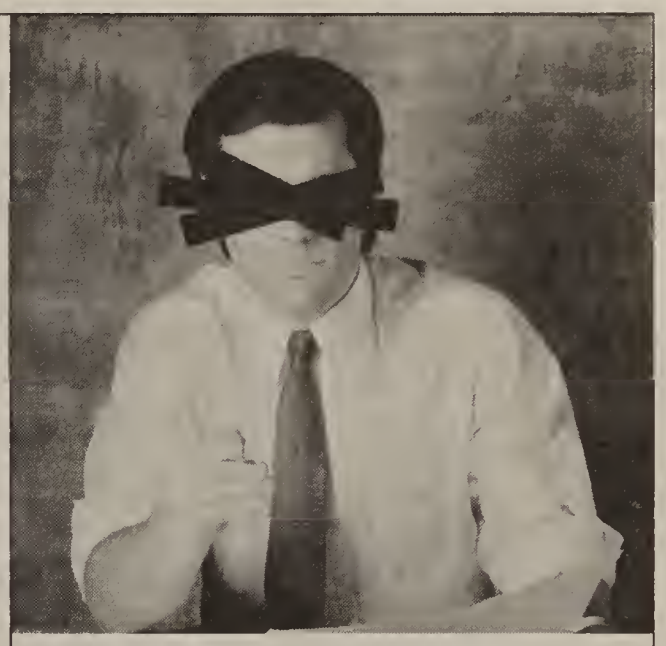
"Our headquarters in [redacted], was the hub of our SNA network. The trick was to increase access to our SNA hosts without killing ourselves financially. Adding [redacted] front-end processors to our network was going to cost [redacted] up front, plus [redacted] every six months in service."

SDLC requires significant FEP resources. But a single CS SNAC can replace up to 28 direct connections, supporting—via multidrop—hundreds of PUs. You can use much smaller FEPs or, in remote concentration applications, replace them entirely.

"The guys from Sync met with me and my boss at [redacted]. They showed us how to save about $[redacted] over the solutions from kingpins like [redacted] and the self-proclaimed [redacted] gurus."

Sync specializes in large-scale SNA connectivity. With over a decade of experience in IBM environments, Sync is expert in maximizing availability and minimizing costs.

"The others are just trying to slap your SNA sessions onto the LAN. Managing my [redacted] SNA traffic is too important to trust to that kind of a kluge. We just said, 'If we've got to do it, let's do it right.' Now our billing people in [redacted] can connect with [redacted] data located in [redacted] with the level of reliability we need."



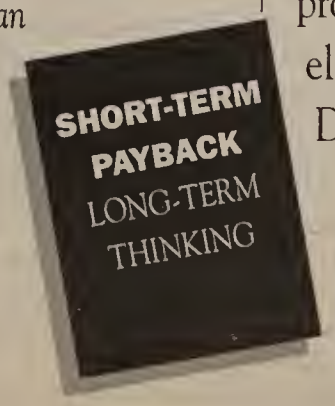
"This technology is our secret weapon. Hey, you're not recording this, are you?"

[redacted]
Network Manager, [redacted] Inc.

The Sync CS SNAC is 100% compatible with token ring, RS-232, V.35 and V.11 interfaces. It can be fully managed from the NetView console, is NetSpy compatible, and is as tightly integrated into SNA as a native IBM device.

"End result? This puts us head and shoulders above our key competitors: [redacted] and [redacted]. I just hope they don't find out about it."

Get the free brochure "Short-Term Payback, Long-Term Thinking," for the whole story. Because you probably won't hear it from anyone else. Call us at 1-800-355-6355, Dept. E61.



SYNC RESEARCH
INTERNETWORKING SNA

International inquiries: Mail or fax your inquiry to Sync Research Database Marketing Services, P.O. Box 391704, Mountain View, CA 94039. Fax: 415-940-4337.

Newbridge, SunConnect strike development deal

BY MAUREEN MOLLOY

Kanata, Ontario

Newbridge Microsystems and SunConnect last week announced they are jointly developing a board that will give Sun Microsystems, Inc. SPARCstations support for TCP/IP routing and other wide-area connectivity features at T-1 speeds.

The Newbridge Networks Corp. division also outlined a strategy to deliver over the next year similar functionality to personal computer platforms, such as Extended Industry Standard Architecture (EISA), as well as standard operating systems, particularly Novell, Inc.'s NetWare.

Along with SunConnect, Sun's network management division, Newbridge Microsystems will develop software that integrates its new Openbus Communications T-1/E-1 interface card with SunConnect's wide-area network software, including SunLink X.25 and SunLink PPP.

The T-1/E-1 card, a first for Sun machines, will be equipped with an integrated data service unit/channel service unit (DSU/CSU) and will support full and fractional T-1/E-1 links directly to Sun SPARCstations and servers. It will let the machines route Transmission Control Protocol/Internet Protocol traffic over leased-line, X.25 and frame relay network links.

Integrated SunNet Manager and Mainstreet 4602 agents will let users manage the cards from existing SunNet Manager or Newbridge T-1 multiplexer management systems, said Lloyd Spencer, Newbridge's director of marketing.

Doug Gold, director of network programs at International Data Corp. in Framingham, Mass., said the new T-1 card for a Sun server — when combined with the routing software embedded in Sun's SunLink product — will transform the device into a WAN access node that will compete directly against Novell, which is also gearing up its NetWare servers to act as WAN access devices for small remote sites.

"The question is, what are the WAN access requirements of these small networks?' Right now most are suited to a 9600-baud modem, not a T-1 access device," Gold said. "But as distributed processing becomes more commonplace within the organization, the need for T-1 access products will become more compelling."

Opening up WAN access

Operating system	PC bus	Availability
T-1/E-1 interface cards		
SunSoft, Inc.'s Solaris	SBus	Spring 1994
Novell, Inc.'s NetWare	Extended Industry Standard Architecture (EISA)	1994-1995
Microsoft Corp.'s Windows NT	Peripheral Connect Interface (PCI)	1994-1995
Low-speed and Asynchronous Transfer Mode cards		
SunSoft's Solaris	SBus	1994-1995
Novell's NetWare	EISA	1994-1995
Microsoft's Windows NT	PCI	1994-1995

Newbridge Microsystems will provide WAN interface cards for computing platforms such as PCs, workstations and servers.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: NEWBRIDGE MICROSYSTEMS, KANATA, ONTARIO.

The ultimate success of the product will depend on price/performance as well as the WAN connectivity requirements at branch locations, he added.

The T-1/E-1 card is first in a line of interfaces Newbridge Microsystems will roll out during the next year. The vendor aims to port its T-1 and future lower speed WAN and Asynchronous Transfer Mode adapters to PC platforms such as EISA and the next-generation Peripheral Connect Interface running NetWare and Windows NT (see graphic, this page).

The card will be available in mid-1994. Pricing will not be announced until January but will be tagged competitively with existing DSU/CSUs and T-1 interface boards, according to Newbridge Microsystems.

✆Newbridge Microsystems: (613) 592-0714; SunConnect (800) 241-2669.

Sterling offers new line of management applications

BY MICHAEL COONEY

Reston, Va.

Sterling Software, Inc. last week launched the next generation of Solve series network and systems management products designed to help users manage their IBM Systems Network Architecture nets.

The new Solve products replace the existing Solve offerings from Systems Center, Inc., which Sterling bought in July. Solve: Problem, Solve: Change, Solve: Configuration and Solve: Asset help users monitor networks for problems such as line outages and manage changes in net configuration and performance from a single monitor. In the past, the Solve applications required individual monitors.

The applications also store information in a common object-oriented database that resides on the mainframe.

Solve: Problem monitors error messages sent to Sterling's host-based Net/Master or IBM's NetView management systems and can automatically initiate responses to problems. It can generate a trouble ticket and keep a record of service required for any device on the net.

Solve: Change and Solve: Asset track applications residing on the mainframe. Solve: Change keeps track of software updates and changes made to MVS CICS applications. Solve: Asset manages application security and maintains an inventory of software on the mainframe. For example, an administrator can define users or groups of users who have permission to access specific applications on the mainframe.

Solve: Configuration keeps a running account of devices and applications on a user's net. When new devices or applications are brought on-line, the application registers them on a Net/Master or NetView screen, as well as other Solve application information.

The new Solve products also work with existing Solve software, such as Solve: Automation, which monitors Net/Master or NetView consoles for error messages and can kick off automated responses to restart a failed device without operator intervention, for example.

Using the Solve applications and the object-oriented database, users can monitor the status of an entire payroll system — devices, communications lines and applications — rather than have operators correlate alarms from individual components.

"The use of object-oriented technology in our central database lets users customize their network and systems management applications more easily than old, flat file-style databases," said Michael Matthews, vice president of marketing in Sterling's System Management Division.

The new Solve products are available starting at $25,000 each.

✆Sterling: (703) 264-8000.

Merger

Continued from page 1

Where Bell Atlantic decides to provide phone service, interexchange carrier access charges could fall, he added.

In the long term, the same broadband networks the companies will build to carry interactive multimedia will be available for high-speed data transmissions for business users.

ULTIMATE GOAL

Bell Atlantic's plan is to provide full-service networks — supporting voice, video and data traffic — to customers in its own mid-Atlantic region and in TCI's service areas. As presented by Bell Atlantic Chairman Raymond Smith, that vision encompasses wired and wireless services across the country, along with video programming and multimedia technologies.

Smith said the company's goal is to develop full-service networks in high-growth markets. The company also hopes to develop the informational, entertainment and transactional services that can be offered over the networks.

Bell Atlantic plans to be able to support video over fiber in selected areas of its mid-Atlantic territory by 1994 and in its top 20 markets by 1998. For TCI's networks, Bell Atlantic plans to accelerate construction of fiber-based networks in major TCI markets. The merger will dramatically increase the cash available to invest in broadband and related services, according to TCI Chairman John Malone.

TWO-WAY SERVICE

Ultimately, Bell Atlantic intends for the networks to support two-way switched broadband service. But for the first few years, the network architecture will limit the carrier to providing telephony and such simple interactive services as pay-per-view movies, home shopping and group video games, according to one of the company's network planners.

Over the past year, Bell Atlantic has been experimenting with video by running fiber to the curb and using asymmetrical digital subscriber line (ADSL) technology, which provides video over copper. ADSL can carry data at 3M bit/sec, providing broadcast-quality video at 30 frame/sec, and Bell Atlantic has been using the technology to provide interactive voice, video and data for a distance-learning trial in a Union City, N.J., school.

Because fiber to the home is expen-

See **Merger,** *page 61*

United

Continued from page 1

each incoming call represents $275 of business for the airline, Camastro said.

With that kind of revenue on the line, United is putting a lot of faith in the AT&T plan, which is a first for the carrier. "I'm sure it will fly," Camastro said.

And AT&T could have a new service on its hands if all goes well.

"We want to see how this solution works for United," said Mike Wert, group product manager for AT&T 800-services net management. "We think there are other companies out there that would prefer a network-based package rather than owning ACDs and the lines that connect them."

ANATOMY OF A CALL

With the AT&T system, when a customer dials the airline's 800 number, the call is routed to an AT&T 4ESS switch, which holds the call while communicating with a network control point (NCP). The NCP, a fault-tolerant minicomputer, uses a Signaling System 7 link to query what AT&T calls a database complex.

The database complex runs special AT&T network management software and continually receives agent availability information over a fiber T-1 from AT&T Definity Generic 3 private branch exchanges spread throughout the carrier's network. The data includes how much time an agent is idle, the time each agent spends on a customer call and the time devoted to postcall work.

The complex uses that data to determine to which agent each call should be routed, then instructs the 4ESS switch to route the call to the 4ESS switch closest to the appropriate reservation center. The call is then passed to a Definity PBX in the AT&T central office, which is linked via twisted-pair lines to phone sets in the reservation center.

"We could handle overflow, but we needed to do it faster and gets calls answered ASAP."

This is a quantum leap forward for United, which, like many other firms with multiple call centers, relied on intermachine trunks between ACDs to pass overflow calls to other centers. "We could handle overflow, but we needed to do better and get calls answered ASAP," said Camastro.

BENEFITS

Although he declined to give specific figures, Camastro said the new custom package will save United a substantial sum.

By treating all call centers as a single pool of agents, United will save staff costs, he said. "We can reduce our staffing without having to jeopardize customer service."

United will be rid of the costly regional T-1s it used to tie centers in Chicago, Denver, Detroit, El Segundo, Calif., Honolulu, San Francisco, Seattle and Sterling, Va. to its corporate headquarters here. The airline will also be able to gradually eliminate its ACDs and, with them, expensive service and support. Camastro added that the ACDs take up precious floor space that can be put to better use.

DMTF preps DMI rollout for better desktop control

BY SKIP MACASKILL

San Francisco

At its Developers' Conference here this week, the Desktop Management Task Force (DMTF) will release the first version of its Desktop Management Interface (DMI), which is designed to give users better control over desktop systems across an enterprise.

More than 40 companies, including 3Com Corp., Digital Equipment Corp., IBM, Intel Corp., Microsoft Corp., Novell, Inc. and SynOptics Communications, Inc., will be on hand to detail implementation plans for DMI.

The DMI is a set of application program interfaces (API) that vendors can use in developing management applications that collect information on a variety of desktop hardware and software components. The information is provided by a Management Information File (MIF) agent on those components.

The DMI lineup

More than 300 companies are pledging support for the Desktop Management Interface (DMI), including:

- Accton Technology Corp.
- Acer Corp.
- Compaq Computer Corp.
- Digital Equipment Corp.
- Eagle Technology, Inc.
- Hewlett-Packard Co.
- IBM
- Intel Corp.
- Microsoft Corp.
- National Semiconductor Corp.
- Novell, Inc.
- Standard Microsystems, Inc.
- SunConnect
- SynOptics Communications, Inc.
- Texas Instruments, Inc.
- 3Com Corp.

GRAPHIC BY TERRI MITCHELL

"The problem with desktop management today is that it's so fragmentary and proprietary that's it's not easy to achieve," said John McConnell, vice president of Infonetics Research, Inc., a consultancy in Boulder, Colo. "What you don't have is a generic tool that can work across a variety of environments. DMI will provide that and allow application developers to deliver better management applications."

The first release, which will support DOS, Windows, Windows NT and OS/2, will be a developers' version, and the specific functions supported will depend on the types of management applications vendors deliver.

Several vendors will announce DMI product strategies at the conference, including:

■ Standard Microsystems Corp., which will implement DMI in its EliteSeries Ethernet and token-ring network interface cards.

■ SynOptics, which will make use of the technology in its Global Enterprise Management applications.

■ Intel, which plans to integrate DMI in its adapter, application server and network management products.

"We are making DMI a priority," said Chris Thomas, manager of technology and alliances at Intel. "Our goal is to provide some level of DMI compliance with the next major release of every product, something we hope to have completed by mid-1994."

The DMI is local to the desktop and independent of any operating system, network operating system or management protocol. It will provide a standard interface to the MIFs — the desktop agents — which are ASCII files that contain information about workstation resources.

MIFs are roughly comparable to the Management Information Bases (MIB) in the Simple Network Management Protocol world.

The DMI is a way for net managers to integrate data on desktop systems into an enterprise management system to get a view of the network down to the end user. DMI will enable an administrator, for example, to determine what hardware and software is in use and how it is configured.

"The DMI will give the user some direction in managing all PCs from an enterprise perspective," said Val Sribar, senior research analyst at META Group, Inc., a consultancy in Reston, Va. "It will take a while for the product to come out, but the release of the first version of DMI is a step in the right direction."

The DMI will interact with SNMP via a proxy agent that will actually convert DMI MIFs into SNMP MIBs, allowing the net manager sitting at an SNMP management console running Hewlett-Packard Co.'s OpenView, for example, to view desktop management information.

The DMTF, which was formed at INTEROP 92 Spring in Washington, D.C. by eight vendors, now includes more than 300 participating members.

The DMI architecture was announced by the DMTF in August 1992, and beta code followed in June of this year, when 30 vendors developed test implementations. The DMTF will distribute the final DMI code and reference documents free of charge over the Internet.

OSI

Continued from page 1

area network-to-mainframe gateway, according to sources. That product removes Transmission Control Protocol/Internet Protocol processing from the mainframe, saving up to 30% of the mainframe's cycles.

IBM said it was looking at "several off-load scenarios and X.400 application options" but declined to discuss the products. The firm has acknowledged in the past, however, that it is working on off-load programs for its RS/6000 (*NW*, Oct. 4, page 1).

Texas recently dropped a policy requiring its agencies to buy OSI products largely because of interoperability problems among vendor OSI products.

OSI Connection/6000, which is now being developed at IBM's Rome laboratory, is a downsized version of IBM's OSI/Communications Subsystems (OSI/CS) software for the RS/6000. It would work hand in hand with the OSI/CS application interface on the mainframe to provide access to existing OSI/CS applications.

OSI/CS supports layers three through seven of the OSI model on IBM's MVS, VM, OS/400 and OS/2 platforms. It provides links to other OSI nets, plus OSI services such as high-level application programming interfaces and session and net management capabilities.

Because OSI, Connection/6000 will include ties to OSI/File Services, IBM's OSI File Transfer, Access and Management (FTAM) software, it can act as a gateway to other FTAM-compliant systems, such as those from Digital Equipment Corp., Novell, Inc., Proginet Corp. and Tandem Computers, Inc.

The new application will also support the Internet Engineering Task Force's RFC 1006, which defines how upper-layer OSI protocols run over TCP/IP nets, sources said. This feature would let users run FTAM or other OSI data over TCP/IP nets.

OSI Connection/6000 is expected to cost much less than OSI/CS, which is priced at about $330,000.

Analysts said the product fits with IBM's desire to get OSI development off the mainframe, where more than $150 million research and development dollars have been spent largely for nothing.

"It makes much more sense to do this work from an RS/6000 than from a mainframe, where no one paid any attention to it," said Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J. "The mainframe just doesn't need to be handling FTAM or X.400 processing."

As for the X.400 application, sources said it is being designed primarily to serve as an enterprise mail switch, linking disparate mail systems. It was not clear whether IBM is developing a completely new X.400 server or porting its existing X.400 mainframe product, Open Systems Message Exchange (OSME), to the RS/6000.

Either way, sources said the new application will off-load X.400 processing currently being done on the mainframe and will support existing OSME applications.

"If IBM implements the 1984- or 1988-based OSI standards in the X.400 products, then users should look elsewhere because there are interoperability problems in vendor implementations of those standards," said Jerry Johnson, a standards analyst in the Texas department of information resources.

"As a user, we still believe in the functionality that OSI promised, but we also need the most cost-effective solution, and we haven't seen that with current OSI implementations," he said.

The state of Texas last week dropped a 2-year-old policy requiring its 240 state agencies to buy OSI products largely because of interoperability problems among vendor OSI products.

The state will now officially back TCP/IP products for its agencies (*NW*, Oct. 11, page 1).

"Two of the biggest problems with OSI products and IBM's OSI products, in particular, has been that they cost too much and provide too little true interoperability," Johnson said. "It would be good for everyone if IBM answered both of those concerns with these products."

Sources said the new applications would not appear until late 1994 at the earliest.

OURS group announces net mgmt. task force

BY JIM DUFFY

Boston

The Open User Recommended Solutions (OURS) user group last week announced that it has formed a task force to determine user requirements for network and systems management and to prod vendors into cooperating to address those requirements.

The Network Management Task Force, unveiled at the OURS Fall Workshop here, comprises users from 11 companies, including Citibank N.A., Electronic Data Systems Corp., Intel Corp., IBM and Pacific Gas & Electric Co. (PC&E).

The group is currently trying to determine the critical issues users face in managing their networks and systems. Once those issues are determined, they will be prioritized, and recommendations for products that address those issues will be delivered to vendors.

Among the problems the group will try to address are the rising cost of network and systems management and user demands for more control over networked resources.

Although management products continue to flood the market, few are addressing resolution of daily operational problems, the task force said.

So users need "tactical solutions" from their vendors to reduce the burden of systems management.

One such solution, according to Douglas Holmes, director of advanced information applications at PG&E, could be vendor cooperation on the develop-

ment of a single set of software services for managing repetitive administrative tasks, such as user profiles, computing assets and software licenses. Such services might be accessed from any management application through a common user interface, he said.

"[We need to address] things that happen over and over again," said Holmes, cochairman of the Network Management Task Force. "It becomes an administrative nightmare as people pile onto the net."

Users need automatic networkwide replication of security parameters.

Holmes used himself as an example. When his office was recently relocated across San Francisco Bay, he said it took several systems administrators, using several different management systems, to bring him back onto the PG&E network and make sure his new personal computer was equipped with all of the software he needed to do his job.

"Every PG&E office has a systems administrator, and they're busy," Holmes said. "That's because every vendor has solved the problem in their own way. It would be nice to walk up to a single console and move Doug's stuff. But there's nothing like that."

Another solution might be a common method for managing multiple directory services that could be deployed in an enterprisewide network. Currently, a method does not exist for automatically updating and maintaining every directory service in a network, Holmes said.

Users also need automatic networkwide replication of security parameters. When security policies are established, users would like to "tell" the network once and have them implemented consistently throughout a multivendor environment, Holmes said.

The Net Management Task Force's recommendations could include input from other OURS working groups, like Data Security, Software Licensing and What Works With What task forces. Many issues being addressed by the separate task forces overlap so OURS is attempting to coordinate activities among the groups, said Linda Heller, executive director of OURS.

For instance, the What Works With What group is attempting to draft a specification that defines a common method for accessing vendor databases that house product interoperability information.

The Network Management Task Force could also pitch this specification to its vendors anticipating that they will develop products that will allow network administrators to determine which products interoperate so they can configure their network accordingly.

✆OURS: (212) 938-5534.

Racal-Datacom unveils integrated bridging for hub

BY SKIP MACASKILL

Boxborough, Mass.

Racal-Datacom, Inc. last week unveiled a new module with integrated bridging for its intelligent hub line that increases overall hub bandwidth availability by keeping local traffic confined to LAN segments.

The 10BT-FTR module's bridging capability, which the company has dubbed work group filtering, lets users set filters and segment ports into separate work groups, a function that typically requires the use of a separate bridge/router or bridge module. The module can support individual workstation or Ethernet segment connections.

This feature is possible by the use of custom application-specific integrated circuit chipwhich were codeveloped by Racal-Datacom and NCR Corp.

In a typical configuration, traffic flowing between two different work groups attached to the same module would have to be bridged across the hub's backplane via a bridge module. The new Racal-Datacom chips allow that traffic to be filtered locally, freeing up backplane bandwidth for other traffic and eliminating the need for a separate bridge module.

"The new modules will increase the efficiency of the entire network by reducing the amount of extraneous traffic flowing across the backplane," said Scott Wieder, director of product marketing at Racal-Datacom. "Users will get better performance, and they won't have to take up hub slots with bridge modules."

The new 10BT-FTR comes in a version that supports 12 unshielded twisted-pair connections via either RJ-45 ports or a 50-pin telephone company-style connector, as well as a 24-port model that features two telephone company connectors. The 13-slot INX5000 can support up to 312 filtered 10Base-T ports when fully configured with the 24-port modules.

The module supports two modes of operation. In Filter Mode, the module acts as a learning media access control bridge, automatically ensuring that work group traffic remains local, as well as filtering and forwarding Ethernet frames at 14,600 packet/sec based on 64-byte packets.

In Security Mode, the module can restrict access of connected nodes to specific hosts and work groups.

"Intelligent filtering won't prevent broadcast storms, but it is beneficial in that it allows logical segmentation of the network to some extent," said Todd Dagres, vice president of data communications at The Yankee Group, a consultancy in Boston. "Since the capability is integrated via silicon, it also represents a step toward switching. Racal-Datacom will likely be able to leverage the chip technology toward that end."

The new modules also provide a variety of troubleshooting features, including error filtering that removes bad Ethernet packets; port autopartitioning that automatically isolates ports receiving or sending an excessive number of bad packets.

The 10BT-FTR also features an on-board Simple Network Management Procotol agent that compiles a range of management information, such as the number of collisions and bad packets received. The module can generate SNMP alarm traps and allow the net administrator to set thresholds.

All three versions of the 10BT-FTR are available now. The 12-port models cost $3,095, while the 24-port version is tagged at $4,195.

✆Racal-Datacom: (800) 722-2555.

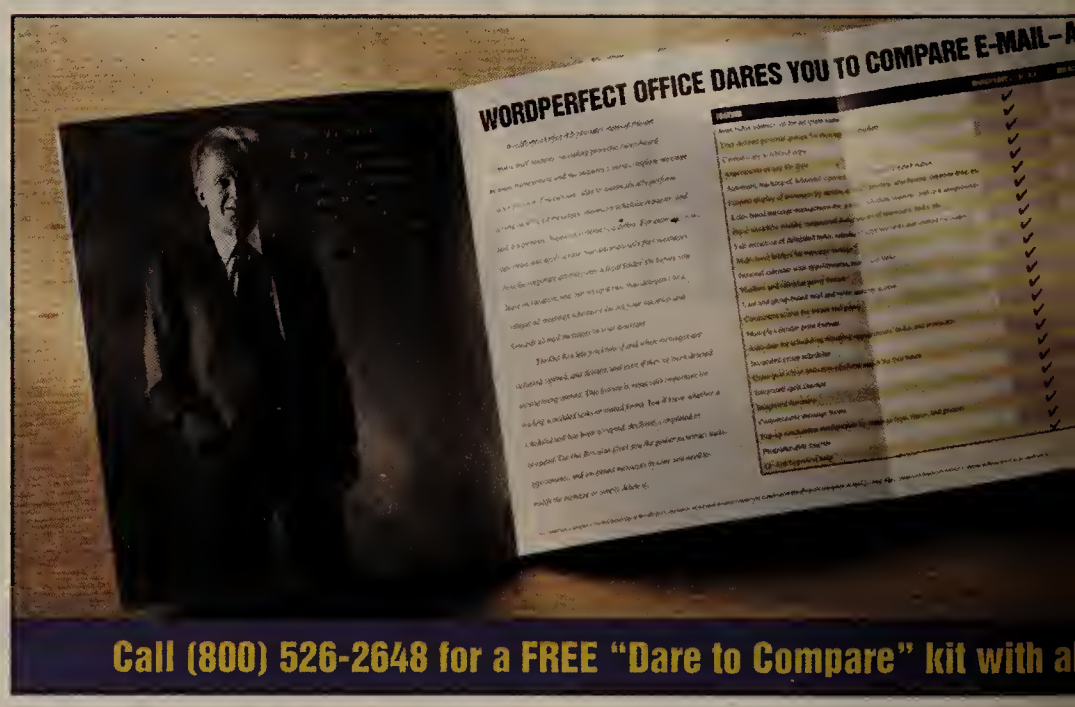
MICROSOFT AND LOTUS E-MAIL PRODUCTS TO

HERE'S WHY.

DARE TO COMPARE

WordPerfect Office

Microsoft and Lotus aren't going to publicly compare their e-mail products to something substantially better. That's why they never mention WordPerfect® Office in any of their e-mail comparison advertising. But while Microsoft and Lotus won't compare their products to WordPerfect Office, you should. Because choosing a workgroup application is a strategic decision that will affect the way your organization works for years to come.



Dare to compare more than just e-mail

Even if you just compare e-mail features, WordPerfect Office 4.0 beats everything in its class. But it takes a lot more than e-mail to run a business these days. WordPerfect Office is the

NEVER COMPARE THEIR WORDPERFECT® OFFICE.

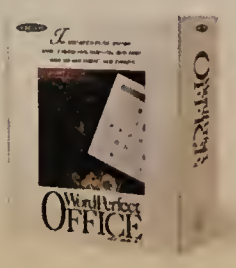
	E-MAIL	INTEGRATED GROUP SCHEDULER	INTEGRATED CALENDAR	INTEGRATED TASK MANAGEMENT
WORDPERFECT OFFICE	YES	YES	YES	YES
MICROSOFT MAIL	YES	NO	NO	NO
LOTUS CC:MAIL	YES	NO	NO	NO

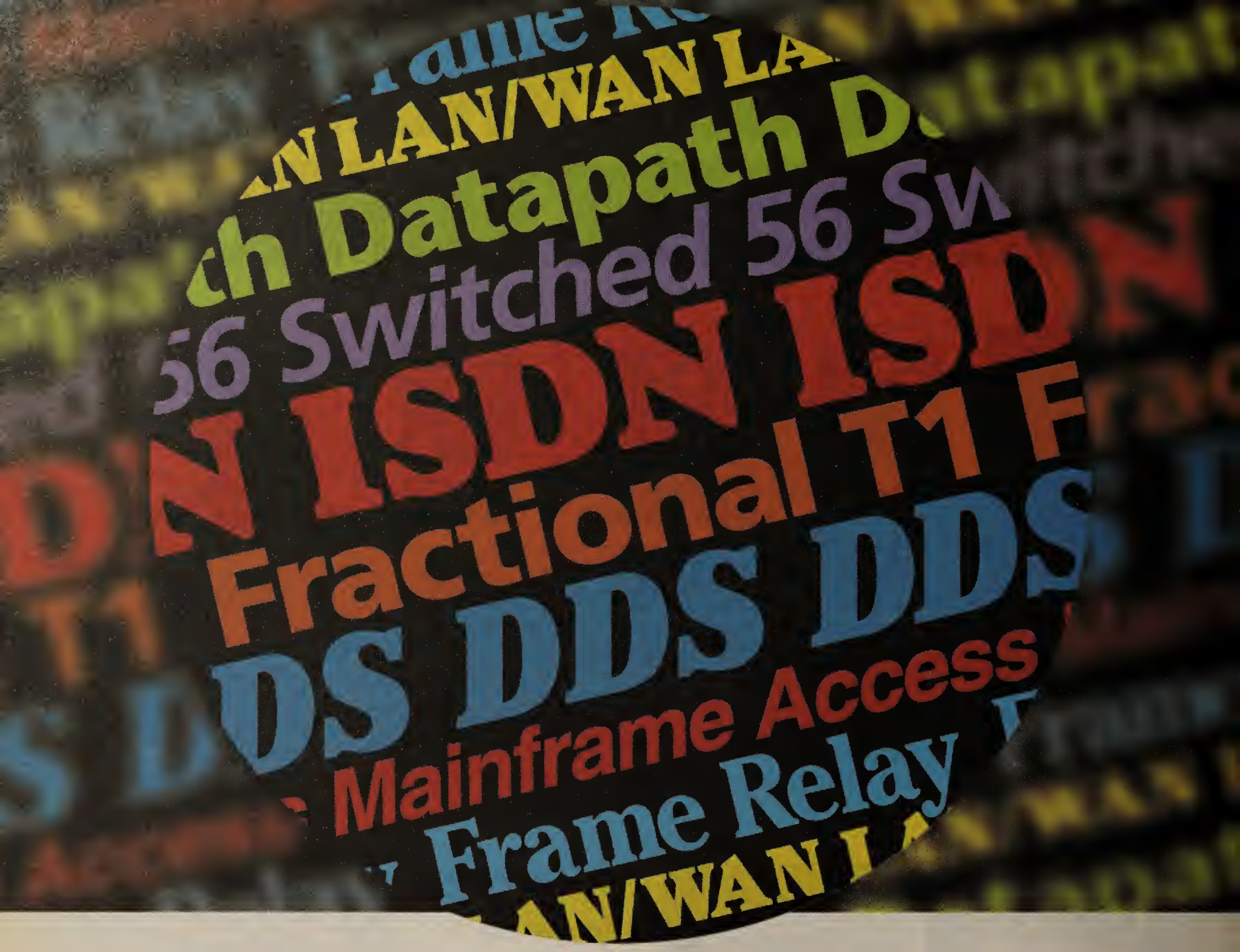
only leading workgroup application that integrates group scheduling, a personal calendar and task-management functions with the industry's most powerful cross-platform e-mail engine. And WordPerfect Office gives you the complete package for what others generally charge for e-mail alone.

Call (800) 526-2648 for a FREE "Dare to Compare" kit

There are more than 100 different features you should compare when choosing a workgroup productivity product, and we can't begin to mention them all here. So we've prepared a free Dare to Compare demonstration kit, with a working copy of WordPerfect Office 4.0 and a detailed comparison guide. Find out for yourself why Microsoft and Lotus won't compare their e-mail products to WordPerfect Office. Call (800) 526-2648 for your free kit.

WordPerfect® Office





UDS is Fully Focused on Digital Datacomm

In the accelerating transition from analog to digital datacomm, only UDS has a full line of switched digital devices that communicate across all predominant access technologies (ISDN, Datapath, Switched DDS).

Products are fully developed and ready for shipment to datacomm users whose systems utilize DDS, switched digital, T1, fractional T1, ISDN or any combination of these advanced communications technologies.

UDS digital products include multi-rate DSU/CSUs with speeds to 56/64 kbps, DSU/CSUs for T1 and fractional T1 applications, frame relay, statistical and time-division multiplexers and a broad range of ISDN terminal adapters and network termination units.

Standalone models of UDS digital datacomm products are easily convertible for space-saving, rack-mounted installation in UDS Data Shelf™ enclosures.

Unlike other manufacturers who offer narrow product lines for limited applications, UDS offers a full migration path to all-digital networking.

For complete product information and help in configuring your digital datacomm system, call

800/451-2369

MOTOROLA
UDS

Datapath is a trademark used under license by Northern Telecom, Inc.

CLIENT/SERVER

Frameworks key to DEC success

BY JIM DUFFY

Maynard, Mass.

The success of Digital Equipment Corp.'s client/server initiative depends in large part on users buying into the vendor's frameworks concept.

DEC last week disclosed an ambitious effort to focus its product development and marketing groups on enterprisewide client/server computing. DEC announced some 150 products and services to fortify its client/server push, and a systems integration concept, called frameworks, to pull its products into an enterprise network and application development infrastructure (*NW*, Oct. 11, page 1).

Frameworks will incorporate pieces of NAS and make NAS technology easier to use and understand.

A framework, according to DEC, is software that integrates new and existing applications so they can be easily shared among users across a wide-area network. Frameworks help facilitate data integration, work group computing, enterprise messaging, and systems and network management in a client/server environment.

The framework concept is an outgrowth of DEC's Network Applications Support (NAS) strategy and encompasses elements of NAS. NAS is a set of software services and proprietary and standard application program interfaces for melding disparate systems and applications into an interoperable enterprisewide network.

DEC's client/server assault includes a tenfold increase in the number of staffers providing client/server integration services.

"We're moving away from using the term NAS," said Andrew Feit, marketing manager for DEC's workstations and servers group. "Customers didn't quite get it. They wanted solutions, and they weren't sure what NAS did to deliver that. So the new piece [of DEC's client/server strategy] is the concept of frameworks."

Frameworks will incorporate pieces of NAS and make NAS technology easier to use and understand, analysts said.

"One of the problems they had with NAS originally was that they had a very large portfolio of services, but it was hard to explain to customers what was there," said Judith Hurwitz, president of Hurwitz Consulting Group, Inc. in Watertown, Mass. "With frameworks, DEC's beginning to take critical services out of the envelope of NAS and bring them to market as separate products."

LinkWorks, DEC's first such framework product, is essentially a repackaging of the vendor's Application Control Architecture (ACA) Services software with other new work flow technology, Hurwitz said. ACA Services, a key component of NAS, is object-oriented software that links independently developed

See DEC, *page 20*

Firm ensuring SNA data integrity through nets

BY MAUREEN MOLLOY

Neptune, N.J.

Continental Insurance, Inc. is in the midst of migrating its point-to-point Systems Network Architecture network to a frame relay net that is expected to slash the insurance giant's monthly leased-line costs by as much as 40%.

When Continental's cutover to the frame relay net is completed around mid-1994, the company's wide-area network costs will plunge from $100,000 to approximately $60,000 per month, said Walter Parezo, Continental's project leader of network planning. At the same time, the insurance firm will have boosted connectivity options for its users in keeping with its commitment to a distributed networking architecture.

"The intent is to get our regional offices connected through virtual circuits instead of having to use multiple leased lines back to the data center," Parezo said.

The company's net was originally based on a point-to-point hierarchical SNA design where 50 field offices dispersed throughout the country fed data into one of 10 regional sites that, in turn, transmitted data to the company's data center here via a spate of 56K bit/sec lines.

Several years ago, Continental made the decision to migrate its legacy SNA net to a distributed computing architecture and began deploying token-ring local-area networks at each of the remote sites.

IBM Application System/400 minicomputers were installed in each regional office to run programs migrated from the company's IBM 3090 mainframe as well as new applications.

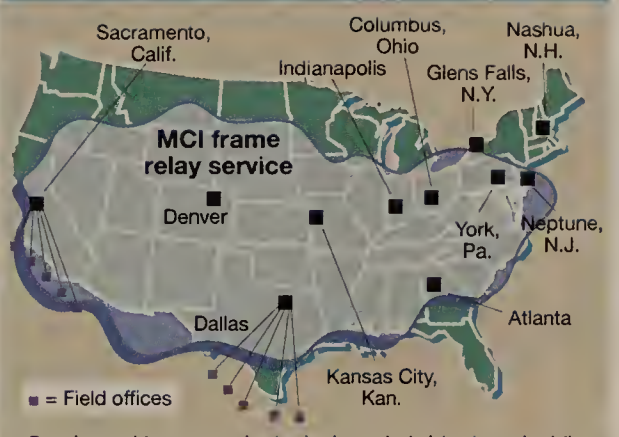
The distributed architecture meant Continental had to provide a more flexible network that would give employees at any office access to the regional computers as easily as the data center.

Using Andrew Corp. VR/7488 Frame Relay Nodes and MCI Communications Corp.'s frame relay service, Continental has created a network that provides any-to-any connectivity among its offices and at a lower cost than the net it replaced, Parezo said.

With frame relay, a single connection into the network from one location can support multiple permanent virtual cir-

See Integrity, *page 20*

Virtual routing via frame relay



Continental Insurance is deploying a hybrid private/public frame relay network to interconnect more than 60 field offices and regional sites nationwide.

SOURCE: CONTINENTAL INSURANCE CO., NEPTUNE, N.J.
GRAPHIC BY TERRI MITCHELL

The recipe for XPE

Company	Product	Purpose
Vixix Software, Inc.	Galaxy	Graphical user interface
PeerLogic, Inc.	Pipes	Middleware
Tivoli Systems, Inc.	Tivoli Management Environment	Network object definition
Networx	Paradigm	Trouble-ticket applications
Corporate Microsystems, Inc.	MLink	File transfer, software distribution

LEGENT has spent $50 million during the past few years acquiring and licensing technologies from a variety of firms to create its Cross Platform Environment (XPE), a family of systems management products for client/server environments.

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: LEGENT CORP., HERNDON, VA.

LEGENT rolls out systems mgmt. architecture

BY MICHAEL COONEY

Herndon, Va.

The $50 million acquisition and licensing spree LEGENT Corp. has been on for the past two years finally paid off last week as the firm rolled out a series of software tools designed to let users manage distributed multivendor environments from a central point.

The LEGENT Cross Platform Environment (XPE) is an integrated set of systems management products and tools that will help users incorporate existing management applications and build new client/server-oriented management applications for handling multivendor environments.

"With this combination of technologies, we are offering users the infrastructure on which they can build network and systems management applications across a mix of host, server and workstation platforms," said John Burton, president and chief executive officer of LEGENT.

XPE comprises middleware, a standard graphical user interface (GUI), a variety of application program interfaces and software developers' tool kits. It will run on OS/2, Windows or Unix-based servers, and support existing LEGENT management applications as well as new ones.

See LEGENT, *page 20*

BRIEFS

Micom Communications Corp. last week announced the Sprinter, a lower end version of its NetRunner Data/Voice Internetwork Node. The device lets users that previously employed separate dial-up lines for transmitting voice and fax traffic to a central site squeeze that traffic together with bridged local-area network data over a leased line at speeds up to 72K bit/sec.

Available now, the Sprinter costs $1,290 for a single voice/fax channel and $1,450 for a voice/fax channel plus a single data channel.

Micom: (805) 583-8600.

Process Software Corp. unveiled a new release of its TCPware software that enables Digital Equipment Corp. OpenVMS systems to participate in Transmission Control Protocol/Internet Protocol networks.

Version 4.0 of TCPware allows OpenVMS systems to share files and print jobs with Novell, Inc. NetWare clients, in addition to TCP/IP nodes.

OpenVMS systems can also emulate NetWare clients for access to data on NetWare servers. Version 4.0 includes Novell's Internetwork Packet Exchange (IPX) protocol stack, supplied by InterConnections, Inc. of Bellevue, Wash., as well as TCP/IP protocols.

The product will be available at the end of this month starting at $5,560.

Process Software: (508) 879-6994.

Systems management start-up **OpenVision** last week disclosed pricing for its products, which will ship in December.

The company's OpenV*OPSS platform, which includes integrated operations, performance, storage and security applications, costs from $49 to $200 for a management agent and $14,999 for a management server.

Users can add OpenVision applications to OpenV*OPSS at a cost of $49 to $500 per agent and $3,200 to $20,000 per server.

OpenV*OPSS runs on IBM's AIX, Sun Microsystems, Inc.'s SunOS and Hewlett-Packard Co.'s HP-UX operating systems.

OpenVision: (510) 426-6424.

Companies announce bandwidth optimization enhancements

BY MAUREEN MOLLOY

ACC last week announced enhancements that enable its line of remote routers to more efficiently use wide-area network links, while Andrew Corp. unveiled a new router that provides some of the same features.

With Release 7.0 for its Nile and ACS 4200 routers, ACC is aiming to minimize wide-area routing costs with a new dial-on-demand capability. In addition, the software includes improved congestion management capabilities to better handle traffic overflow when routing data over frame relay networks.

The dial-on-demand feature lets users employ dial-up facilities as their primary WAN link and enables the router to establish switched connections on an as-needed basis based on user-defined triggering parameters such as the time of day.

Dial-on-demand will support applications such as occasional file transfers and handle overflow during peak traffic periods, as well as provide remote net access and management.

The frame relay congestion management feature in Release 7.0 boosts overall network efficiency by reducing the router's data transmission rate once the network begins to experience congestion. While that helps decrease the number of dropped packets and the need for retransmissions, it does not address the ultimate source of congestion problems — the rate of data flow from source nodes.

The congestion management capability works in conjunction with ACC's existing Express Queuing software feature, announced last year, that dynamically allocates bandwidth to improve response times for all users across WAN links.

Most router vendors let users prioritize traffic using manually configured filters. ACC's Express Queuing goes a step beyond that by automatically providing bandwidth to all user sessions sharing the wide-area link, with higher priority traffic receiving a larger share. Release 7.0 is available now as a free software upgrade.

In addition to Release 7.0, ACC announced an integrated Basic Rate Interface Integrated Services Digital Network terminal adapter for Nile, the company's remote multiprotocol Ethernet or token-ring router. Also, the vendor announced enhanced Simple Network Management Protocol net management support that can handle Management Information Base (MIB) I and II, as well as the frame relay MIB and the DS1 MIB.

The frame relay congestion management feature in Release 7.0 boosts overall net efficiency by reducing the router's data transmission rate.

ANDREW'S ENTRY

Andrew, meanwhile, last week unveiled the PathWise/6100N, an access router that supports load sharing, a 2-to-1 data compression ratio and an express queuing software feature that decreases the amount of data traversing wide-area lines to ease net congestion.

The 6100N is equipped with one local-area network and two WAN interfaces, and supports the Transmission Control Protocol/Internet Protocol, Novell, Inc.'s Internetwork Packet Exchange (IPX), DEC's DECnet, Xerox Corp.'s Xerox Network Systems and Apple Computer, Inc.'s AppleTalk. On the wide-area side, the router supports frame relay, X.25, Switched Multimegabit Data Service and ISDN at speeds up to T-1.

In addition to the data compression feature, the router is equipped with an express queuing algorithm that, like ACC's method, isolates data streams and allocates bandwidth on an equal basis to provide predictable response rates for all traffic.

The 6100N is equipped with signaling intelligence to support bandwidth on demand, enabling it to use dial-up lines to handle overflow traffic from private lines. The router can monitor the leased line and, if traffic exceeds user-defined parameters, a dial-up connection would automatically be initiated and traffic balanced across the links. When the volume returns to normal, the dial-up connection is automatically terminated.

The 6100N, which can be monitored by any SNMP-based net management system, costs $4,750 and is available now.

✆ACC: (805) 685-4455; Andrew: (708) 349-3300.

Comments

If you have a comment on this or any other article, drop us a fax at (508) 820-3467 or call (800) 622-1108, Ext. 487.

1-800 RACAL 55

WORLDWIDE AVAILABILITY

HIGH SPEED DIAL MODEMS

NETWORK MANAGEMENT

1-800 RACAL 55

In The Race To V.FAST, Hardware Upgrades Always Finish Last.

Finish First With Racal-Datacom.

You've read their claims. They tell you their V.Fast modems will someday transmit at the upcoming 28,800 bps standard with a "simple" hardware change. They tell you nothing could be more economical. They tell you nothing could be easier.

The Only Upgrade Kit You'll Ever Need.

What they *don't* tell you is that any hardware-upgrading can be a long, slow laborious process. Chip swaps and board replacements can disrupt your move to V.Fast by weeks. Even longer if a complete product replacement is needed.

But not with Racal-Datacom's software definable V.Fast modems.

Far easier and far more cost effective than hardware upgrades, the Racal-Datacom ALM 3239 has on-board micro-processors that accept changes instantly.

You'll get to V.Fast in less than 50 seconds through the ALM 3239's RS-232 port; within a few minutes via the telephone line. There's no exchanging of hardware. There's no on-site disruption.

The ALM 3239 supports DTE speeds up to 115,200 bps and can be remotely monitored, diagnosed, controlled and configured non-interruptively through the CMS® 400 network management system.

V.Fast from Racal-Datacom. Hardware upgradeable modems aren't even a close second. For a free copy of Racal-Datacom's "A Quick Guide To V.Fast," call **1-800-RACAL-55.**

1-800 RACAL 55

RACAL

MAXM unveils new version of net management system

Includes enhanced automation, security features.

BY JIM DUFFY

Vienna, Va.

MAXM Systems Corp. last week unveiled a new release of its MAXM network management software that features enhanced automation and security, as well as new database and data presentation features.

MAXM is an integrated voice and data network management system that runs on OS/2 client workstations and IBM RISC System/6000 servers. It receives alerts and alarms from element management systems and automatically responds to those events based on user-defined rules and script files.

MAXM can also share management data with IBM's NetView management system so operators can get an integrated view of Systems Network Architecture and non-SNA environments from a single console.

Release 3.1 of MAXM includes IBM's REXX scripting language. Using REXX, network managers can program script files that allow the MAXM system to automatically initiate 3270 terminal sessions with IBM mainframe applications.

For example, a network fault captured by MAXM could kick off a REXX script file that allows the system to access IBM's Information Management problem management system to retrieve data for a trouble ticket.

The new security features, meanwhile, include expanded user authorization capabilities. With this feature, network administrators can define what individual MAXM operators can do with their systems, such as which equipment they can monitor and manipulate, and what commands they can issue in response to alarms.

MAXM can automatically initiate 3270 terminal sessions with IBM mainframe applications.

For example, an administrator can use MAXM 3.1 to parcel out different responsibilities to individual help desk members. The administrator can decide what information shows up on individual screens and where to route certain calls for assistance.

Features of MAXM 3.1

REXX scripting language
Allows automated access to IBM mainframe data

Enhanced security
Allows administrators to delegate various levels of management responsibility to different operators

Expanded database support
Allows administrators to copy an off-line database to the MAXM database

Database integrity
Requires predefinition of managed elements and authorized operators

Expanded data presentation
Pop-up menus of predefined elements and operators

SOURCE: MAXM SYSTEMS CORP., VIENNA, VA.
GRAPHIC BY SUSAN J. CHAMPENY

New database features include the ability to configure MAXM with a different database if the system's primary database is taken off-line for some reason, such as for a change in the network configuration.

For instance, MAXM 3.1 has an automated Unix database copy command that lets the system load network configuration information onto a new database from the one that has been taken off-line. MAXM supports IBM DB2 and Borland International, Inc. databases.

The new security features include expanded user authorization capabilities.

MAXM 3.1 also requires users to log descriptions of network elements and user profiles in the database before performing any management function on them. The feature is meant to ensure that management commands are issued to the appropriate device or user.

MAXM 3.1 also supports a greater number of pop-up screens and menus than previous versions of the management system. For example, when a user predefines elements and operators, labels representing those those entities will now appear on the MAXM screen.

MAXM 3.1 is available now. An installation charge for existing MAXM users is $3,000.

✆MAXM: (703) 761-0400.

Communicate At Breakthrough Speeds.

Get AT&T's SYSTIMAX® Structured Cabling Systems, And Get Speeds Beyond 100 Mbps.

Over copper. Or fiber. Your network can now have unprecedented speed and interoperability. All by installing AT&T's SYSTIMAX Structured Cabling Systems, with our HIGH-5™ product family of Category 5 components. They support today's network applications and emerging technologies like ATM, up to speeds of 155 Mbps. And this total solution offers you end-to-end connectivity, maximum network compatibility and the ability to evolve your network as your future needs change. All from a single, reliable source. AT&T's HIGH-5 products exceed EIA-568 Category 5 specifications, and every certified installation includes AT&T's 15-year extended product warranty. The copper cabling was created by AT&T Bell Laboratories and has become the benchmark for Category 5 standardization testing. So find out how AT&T's SYSTIMAX Structured Cabling Systems can help you break through communications barriers. Call us at: **1 800 344-0223, ext. 3013.** Outside the U.S.: **602 233-5855.**

AT&T Network Systems And Bell Laboratories. Technologies For The Real World.

AT&T
Network Systems

LEGENT

Continued from page 15

For example, XPE incorporates LEGENT's Paramount network and systems management platform, which integrates LEGENT's previously stand-alone systems and network management tools. Those tools include the LANSpy local-area network performance monitor and NetSpy, a Systems Network Architecture device performance monitor, both of which now report LAN and SNA performance data back to a single Paramount monitor.

XPE also includes vast amounts of technology from firms LEGENT has acquired or licensed technology from during the past couple of years.

For example, XPE's Galaxy GUI comes from Visix Software, Inc., while PeerLogic, Inc.'s Pipes middleware provides protocol independence, enabling users to run distributed management applications on any platform and using any network protocol.

In September, LEGENT acquired Corporate Microsystems, Inc. and its MLink file-transfer and software distribution technology for OS/2, DOS, Windows and Macintosh PCs. LEGENT also recently acquired Networx, which makes Paradigm, a Unix-based trouble-ticketing program. MLink and Paradigm technologies are included in XPE.

With the XPE framework in place, users will be able to monitor Unix-based servers, distribute software to Unix- and OS/2-based devices using any network protocol, keep track of their SNA hosts and automatically initiate file transfers — all from a single workstation of their choosing, LEGENT's Burton said.

XPE will be available by mid-1994. Pricing has not been set yet.

✆LEGENT: (703) 708-3000.

DEC

Continued from page 15

applications and allows them to issue calls to invoke the services of other applications and exchange data.

LinkWorks is object-oriented groupware that allows users to combine applications as objects and work on them collaboratively.

The product is an example of how the framework concept is intended to bring NAS into the world of object-oriented distributed computing, according to Frank Dzubeck, president of Communications Network Architects, Inc., a Washington, D.C. consultancy.

"LinkWorks is an object-oriented version of what they were doing before within NAS — transitioning you into an object environment by taking and reusing a great deal of what they did for NAS," Dzubeck said. "What they're doing is reengineering and enhancing the entire NAS concept."

Over time, DEC will "productize" more NAS services by wrapping them into frameworks.

Integrity

Continued from page 15

cuits (PVC), each of which supports a link to a remote office. In effect, that lets users create a meshed network design with only a single access link from each site.

The VR/7488 is a fast-packet switch that provides connectivity over a frame relay network using Andrew's so-called Virtual Routing architecture, which combines frame relay with source route bridging. It can be used to build a private frame relay net, to access a public carrier's frame relay service or to create a hybrid private/public network.

BUILDING A BETTER NET

The new net configuration links regional offices to each other and to the Neptune data center using MCI's frame relay service (see graphic, page 15).

Most regional offices have an average of six PVCs — one at 56K bit/sec to each attached field office and another 256K bit/sec PVC to the data center. The plan is to add more PVCs, connecting regional sites to one another.

Local field offices, on the other hand, access the MCI net via a 56K bit/sec frame relay link to the VR/7488. That provides connectivity to the regional AS/400 and gives each field office a link to other regional offices attached to the same VR/7488, forming a private frame relay net in each region.

Today, the company's entire West Coast region is using frame relay in its production network, while sites in the Midwest and on the East Coast are expected to be using the service by the middle of next year.

In California, Continental's field offices are outfitted with Andrew remote bridges that support frame relay-based private-line connections to a VR/7488 node in the Sacramento regional office. That gives the company a small, private frame relay network linking field offices to each other while also providing them with access to the MCI frame relay cloud via Sacramento.

Parezo said this implementation allows him to take advantage of cost structures that favor dedicated lines on a local basis while favoring a usage-based frame relay service on a national basis.

BRIEFS

Novell, Inc. last week transferred rights to the Unix trademark to **X/Open Company, Ltd.**, one of the leading international open systems standards organizations. In conjunction with the announcement, X/Open executives said the group would, by late next year, implement a branding and certification program that vendors will have to put their products through in order to have the Unix name.

According to Novell, the reason for the trademark transfer was to move current and future Unix development to an industry-standard organization rather than have that development controlled by a single vendor. Last week's announcement was supported by NCR Corp., Hewlett-Packard Co., IBM, The Santa Cruz Operation, Inc., Sun Microsystems, Inc. and other leading Unix vendors.

This move follows last month's agreement by 75 vendors to adopt a common Unix application program interface specification, known as Spec 1170.

The combination of the two announcements should virtually solidify the unification of the long-disparate Unix market, helping to ensure much-needed application and system portability.

Network Peripherals, Inc. (NPI) and **NCR Corp.** last week signed a development agreement under which NCR will resell NPI's Micro Channel Architecture-based Fiber Distributed Data Interface adapter cards for its System 3000 series of computers running Unix System V Release 4 (SVR4). The companies will also jointly develop software drivers for the adapters that support the SVR4 operating system. The FDDI adapters will be available from NCR this month.

NPI: (408) 321-7300; NCR: (513) 445-5000.

LANNET, Inc. last week unveiled four new hub modules for its MultiNet line of intelligent hubs.

The LE-110CQ is a three-port attachment unit interface (AUI) Ethernet port-switching repeater module that connects as many as three 10Base2 segments to the hub and switches them via software to any of the hub's four internal backplanes.

The LE-115Q is a three-port AUI transceiver module geared to connecting individual end stations to the hub and switching them among the four backplanes.

The LE-120SQ and LE120Q/ST are five-port 10Base-F port-switching hub modules targeted at switching fiber-optic interhub Ethernet backbones between any of the four internal backplanes. The 120Q features two single-mode and three multimode fiber ports, while the 120Q/ST has five multimode ports.

The 110CQ costs $2,250 and is available now. The other three modules — 115Q, 120Q and 120Q/ST — will be available next month and cost $1,495, $6,995 and $2,195, respectively.

LANNET: (714) 891-5580.

Sequent releases Pentium multiprocessor Unix servers

Available in stand-alone or cluster configurations.

BY CHRISTINE BURNS

Beaverton, Ore.

Sequent Computer Systems, Inc. this week will release several new Unix-based symmetric multiprocessing servers based on Intel Corp. Pentium processors.

The new Symmetry series comprises four members. The Symmetry 2000/290 scales from two to six Pentium processors and is geared toward branch office or work group computing. The Symmetry 2000/490 offers two to 10 processors for departmental computing, while the Symmetry 2000/790 supports as many as 30 processors for data center environments.

The Symmetry 2000/990 is a clustered offering including two or more of either the 2000/290, 2000/490 or 2000/790 servers.

The Pentium-based Symmetry 2000 systems perform at levels two times that of the Intel i486-based Symmetry systems currently on the market, said Kevin Joyce, product manager for future systems. Each Pentium processor can execute two instructions at once and can perform at speeds of more than 100 million instructions per second.

The Symmetry 2000 line comes with 3.5-in. Small Computer System Interface (SCSI)-2 disk drives instead of the 5.5-in. disk drives used on the existing Sequent machines.

Sequent officials said users can upgrade i486-based Symmetry 2000s simply by plugging in the Pentium chips and SCSI-2 drives. However, they also expect to soon abandon the production of the old family of servers.

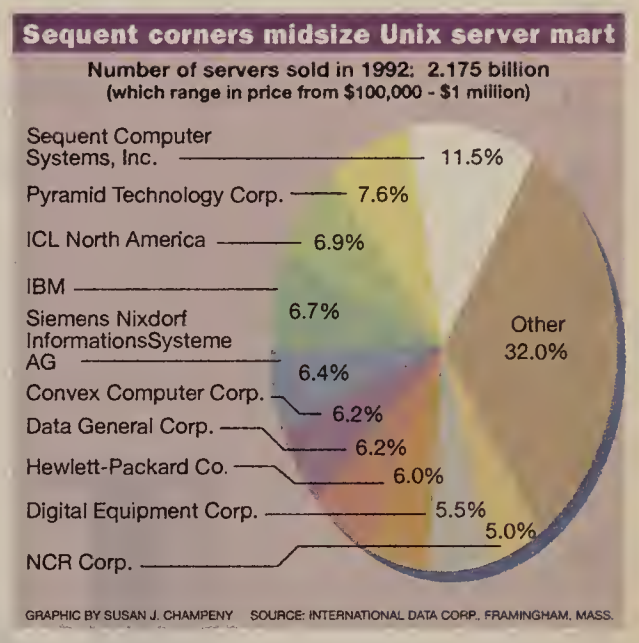
"We think the market will force us to do that because we feel most customers will switch to the Pentium strictly for the better performance," Joyce said.

The entire Symmetry 2000 family runs on and is shipped with DYNIX/ptx, Sequent's version of Unix that is compliant with the Open Software Foundation, Inc.'s application environment. DYNIX/ptx supports symmetric multiprocessing within a Unix network, C/2 security, up to 1.5G bytes of system memory and on-line diagnostic capabilities.

Using add-on products, the servers can be configured to support IBM's Systems Network Architecture for mainframe connectivity and Digital Equipment Corp.'s DECnet for peer hooks.

Personal computer-based local-area network links can be added via support for SunSoft, Inc. NFS, Novell, Inc. NetWare, Ether-

See **Sequent**, *page 26*



APPS DEVELOPMENT

Novell brings out first pieces of its AppWare

BY CARYN GILLOOLY

Dallas

Novell, Inc. dedicated a developers' conference earlier this month almost solely to AppWare, delivering the first products in the family and offering more detailed explanations of what AppWare is and how it works.

PAUL BUCK

STERNICK

The company also had on hand some of the first users to come out with software developed using AppWare tools who attested to the power of its various components.

AppWare is an application development environment designed to help users and vendors develop cross-platform applications that are independent of the graphical user interface, operating system or network operating system.

Today, most development products are tied to one environment, making it difficult to build enterprise applications that can run within multivendor environments.

See **AppWare**, *page 25*

Olicom unveils token-ring products for remote sites

BY SKIP MACASKILL

Dallas

Olicom USA, Inc. has bolstered its token-ring line of products with the introduction of a new work group hub and a family of bridge/router modules for Novell, Inc. NetWare environments.

The company also rolled out a pocket-size token-ring adapter for notebook personal computers as well as a token-ring network interface card (NIC) that supports the PCMCIA standard.

The new hub, dubbed the Controlled Attachment Module (CAM), is a 10-port device. It combines the Simple Network Management Protocol capabilities of a Controlled Access Unit with support for as many as two 20-port Lobe Attachment Modules, providing managed support for as many as 50 end nodes via unshielded twisted-pair wiring.

Pricing for the CAM, which will be available in December, starts at $2,195.

Complementing the CAM is the new line of PC-based token-ring bridge/router NICs, offered in three versions for Industry Standard Architecture (ISA), Extended ISA (EISA) and Micro Channel Architecture (MCA) buses.

When the NICs are placed in a PC running NetWare and Novell's Multiprotocol Router software, the user gains a cost-effective remote access solution for branch offices and work group local-area networks, according to Max Jensen, Olicom's president.

The NICs support the Internet Protocol, Internetwork Packet Exchange (IPX), AppleTalk, Network Basic I/O System and Open Systems Interconnection protocols, as well as an aggregate throughput rate of 19,000 packet/sec.

Available now, the ISA and MCA models cost $595 each, while the EISA version is tagged at $695.

Olicom also unveiled two new products for the PC notebook and laptop users. The new Pocket Adapter is a token-ring NIC that connects to the parallel printer port of a notebook PC, providing connection to any 4M or 16M bit/sec token-ring LAN and access to file servers, printers and applications that reside on the LAN.

The Pocket Adapter is available now and costs $399.

Olicom's new PCMCIA Type II Adapter offers the same type of connectivity as the Pocket Adapter via the laptop or notebook PC's PCMCIA Type II port.

Available sometime in December, the PCMCIA Type II Adapter costs $495.

©Olicom: (214) 423-7560.

It's a sm

PCMCIA Adapters (adapters for devices with PCMCIA Type II slots)

ThinkPad 720C (486SLC2 50/25 MHz processor, 2 PCMCIA slots)

And it's getting smaller all the time. Consider our PCMCIA adapters for Token-Ring, Ethernet or 3270 Emulation, for example. They're designed to network devices with standard PCMCIA Type II* slots. Including the IBM ThinkPad,® one of the biggest little sellers going.

all world.

PCMCIA Technology from IBM

Portables launched an era of miniaturization making mobile computing one of the fastest growing segments in the technology marketplace today.

PS/2 E Energy Workstation (486SLC2 50/25 MHz processor, 4 PCMCIA slots)

IBM helped define PCMCIA standards for this emerging market. We realized that, as the world gets smaller, innovation, standards and interoperability would be vital. We were also the first to introduce a family of credit card adapters that allow virtually any device with a PCMCIA Type II slot to connect to Token-Ring LANs, Ethernet LANs or host-based systems via 3270 emulation. Once portables were in the loop, we had another big idea. We brought our thinking on miniaturization to the desktop. The IBM PS/2® E is a new kind of PC that leverages this technology. And it includes an array of PCMCIA Type II slots that, among other things, provide network connectivity as well as exclusive lock/unlock security.

ThinkPad 350C (486SL/25 MHz processor, 1 PCMCIA slot)

Discover how big small can be. To order or for more information about IBM's PCMCIA adapter cards, just call 1 800 IBM-CALL, ext. S82C. IBM PCMCIA technology. Small wonder.

Making networks work.

IBM

NET RESULTS

by Mark Gibbs

Peers and mistakes

Do all of you net managers and MIS folks remember when personal computers first appeared? Data processing got caught off-guard. It thought it had the organization's computing under control, then all of those departmental loonies went out and bought PCs without asking them.

So DP then changed its name to management information systems (or something similar) and took charge. And just as it started to come to grips with PCs, it was caught off-guard again. This time by LANs.

But MIS now has all of these issues under control. It manages PCs and LANs, as well as things like downsizing, rightsizing and reengineering.

And just when you thought it was safe to manage the network, a new threat comes slicing its way through the data stream...it's peer-to-peer networking.

At one time, peer-to-peer networking was considered a joke. It was seen by the professional networking community as the LAN equivalent of training wheels.

But as PCs have become more powerful and peer system technology has matured, peer systems have grown up. The price/performance ratio has improved, and companies such as Artisoft, Inc. have become a serious market force. So much so that even the networking juggernaut Novell, Inc. took notice and jumped in.

The environment that peer systems address consists of the departments with enough clout or guts to go it alone — basically, anyone who hasn't got the time, financial resources or staff expertise required to get involved with the high-end products. Now you don't have to pay more than $50 to $150 per PC for peer networking software. And worse still, from an MIS point of view, they're easy for users to install and get running.

So what does this mean in corporate networking circles? Well, remember the PCs and LANs that caused you headaches when they appeared? As that well-known commentator Anonymous has noted, "There is nothing wrong with making mistakes. Just don't respond with encores."

The problem? Peer software is infiltrating your company right now! It's out there. A few people in at least one department want to do some stuff that you haven't shown interest in or offered support for. So they're taking matters into their own hands.

They're still using your file server, but where they want to do whatever it is that you're not supporting (sharing a database, for example), they're building their own subnetwork. They're sharing data, transferring files, and doing unsanctioned and unplanned things!

Unfortunately, unless you have truly despotic and totalitarian powers (such as being able to kill miscreant users), there's going to be little that you can actually do.

Users are going to find peer systems seductively useful. They'll be able to do things that they can't do through your file server services, and they'll be able to do them at a cost that won't even dent their discretionary budgets. And you've already provided them with all the hardware they need.

Unfortunately, peer systems bring consequences to the system as a whole. Increases in traffic are likely, so you'll want to think about installing more routers to partition off these renegades.

Security will gain a whole new dimension since it's unlikely that the users are going to be any more interested in security than they have been to date. And in a poorly secured peer environment, a snooper or, worse still, a computer virus, can traverse the network with incredible speed.

Now is the time to do something and avoid being caught off-guard. Come to grips with peer technology, build a corporate network culture that values security and work with the users to get them on your side.

Most of you won't have choices, and as the French say, "Only he who does nothing makes a mistake."

➾Gibbs is a writer and consultant based in Ventura, Calif. He can be reached at (805) 647-2307or on the Internet (mgibbs@rain.org).

Put the System 3000 at the heart of your network.

To learn more about SynOptics' LattisSwitch™ System 3000, simply complete this card and drop it in the mail.

Name _____

Title _____

Company _____

Address _____

City/State/Zip _____ Telephone _____

SynOptics

OSAD9307:NW

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS MAIL PERMIT NO. 1038 ANNAPOLIS, MD

POSTAGE WILL BE PAID BY ADDRESSEE

SynOptics

SynOptics Communications, Inc.
c/o TeleSpectrum
Suite 100
190 Admiral Cochrane Drive
Annapolis, MD 21401-9675

AppWare

Continued from page 21

According to Novell executives, the idea behind AppWare is to make it easier to build network applications, which the company hopes will increase the demand for NetWare to support those applications.

At its developers' conference here, Novell brought out the three primary components of AppWare: the AppWare Foundation Software Developers' Kit (SDK), Visual AppBuilder and the AppWare Loadable Module SDK.

The AppWare Foundation SDK is a set of programming libraries and a universal application program interface (API) for third-generation language programmers. The API allows a developer to write application code once and recompile it to run on multiple platforms, rather than coding and recoding to the different API sets specific to each platform.

The SDK is available now for Windows, Apple Computer, Inc. Macintosh, Novell UnixWare, Sun Microsystems, Inc. SunOS and Hewlett-Packard Co. HP-UX platforms. Future versions will support OS/2, Windows NT, Sun's Solaris and IBM's AIX platforms, as well, Novell said. The SDK costs $595 for each platform.

Visual AppBuilder is a fourth- and fifth-generation language application development tool that developers as well as customers can use to build their own applications graphically.

This is done by linking together icons that represent prebuilt blocks of code, known as Application Loadable Modules (ALM), which perform different functions. ALMs can range from simple graphic utilities to SQL-based client/server connections to file, print, electronic mail or directory services.

To fill in gaps or provide functions specific to their own requirements, users and developers can create their own ALMs using Novell's ALM SDK, available now for $295. Visual AppBuilder is also available now on the Windows and Macintosh platforms for $495.

PAUL BUCK

WEIDL

The three primary pieces of Novell's AppWare had been available previously from Serius Corp. and Software Transformation, Inc., both of which Novell acquired earlier this year. By combining them into a single development environment, Novell eliminated the overlap between them and enabled developers to use the tools in concert.

KEEPING UP WITH COMPETITION

Users are enjoying the new synergy. For example, Kaetron Software Corp., a software developer based in The Woodlands, Texas, has been using the AppWare Foundation to help move its existing flow-chart building tools to alternate operating systems.

See AppWare, *page 26*

Third parties further AppWare

Novell, Inc. was not the only company shouting the praises of AppWare at the recent NetWorld 93 Dallas. Borland International, Inc., Gupta Corp. and WordPerfect Corp. used the show to announce support for the application development environment.

Borland said it will incorporate Novell's AppWare Foundation Framework into its own ObjectWindows Library, which is an application development product that lets developers use objects to build Windows applications.

This bundling will be most beneficial to ObjectWindows users because the Windows-specific implementation underlying ObjectWindows will be replaced by the AppWare Foundation application program interface. Users will be able to build applications for platforms other than Windows, such as Apple Computer, Inc.'s Macintosh, UnixWare, Sun Microsystems, Inc.'s SunOS and Hewlett-Packard Co.'s HP-UX.

Gupta announced it will develop an Application Loadable Module (ALM) version of its SQLBase database engine. In addition, Gupta will build a Quest ALM for use in Visual AppBuilder, deliver an AppWare version of its SQL Windows development tool and incorporate the AppWare Foundation in its next generation of SQL Windows and Quest products.

And, finally, WordPerfect announced it plans to use Novell's AppWare Foundation for future in-house development. This will add platform portability, standard networking interfaces as well as interapplication functionality to WordPerfect's word processing, presentation graphics and work group applications.

BY CARYN GILLOOLY

AppWare

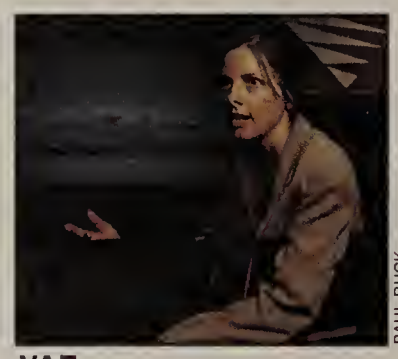
Continued from page 25

Wendy Sternick, president of Kaetron, now expects the company will triple in size due to the additional platform support.

"We were purely a Mac shop, but our customers said they needed a product to run under Windows. That's when we met STI," Sternick said, referring to Software Transformation, Inc.

Starting with one of the company's two products, the Windows conversion took about eight months, including the time it took to virtually rewrite the program and learn the new AppWare Foundation environment. The company will now begin converting its second product, which Sternick estimates will only take about four months to rewrite, with the learning time eliminated.

Should Kaetron decide to port its software to additional operating systems, such as Unix, OS/2 or Windows NT, it need only recompile the existing applications within these environments.



PAUL BUCK

VAZ

Within the academic computing offices at the University of Chicago, programmers write applications that are used by the university's students and faculty.

The programmers, who are also Macintosh users, had been used to spending several years to develop applications.

"We knew we had a problem when it took us the equivalent of nine years to build one application," said Eric Weidl, a programmer at the University.

Weidl began looking at a variety of application development tools, including HyperCard, a tool specific to the Macintosh environment. But, he said, HyperCard was too slow and would only let the programmers develop Mac applications; they needed a tool that would let them develop for other environments, as well.

Weidl then came across a Serius product, which is now Visual AppBuilder. "This was the easiest cross-platform tool I'd ever seen; all the other ones we looked at had too many incompatibilities," Weidl said.

Weidl began building an application for the biology department that ran sets of calculations designed to show students the randomness of genetic makeup.

Within six months, the application was complete.

OILING THE WHEELS

Lisa Vaz, a systems programmer at the Environmental & Health Sciences Laboratory of Mobil Oil Corp., needed to build an application to more easily create purchase orders and track spending in her department.

The lab had just moved from a VAX-based system to a Macintosh environment, so she needed to develop a purchasing application that could work on a Macintosh but connect to the Rdb database residing on the VAX.

Vaz chose to use Visual AppBuilder and the ALMs, then sold by Serius.

It took her about six months to develop the application that lets the scientists in the lab select an item to purchase, put in the approximate price and send the order to the database. The database then prints the order so it can be signed and sent out.

Sequent

Continued from page 21

net, token-ring, Transmission Control Protocol/Internet Protocol and Fiber Distributed Data Interface protocols.

Symmetry 2000/990 systems are two or more Symmetry servers that are linked and share common disks or tape units. The multiple nodes are controlled using Sequent's CLUSTERS/ptx software, which enables applications to view multiple-node systems as a single, large system.

The Symmetry 2000/990 clustered systems can be used in two ways.

The first provides high processor availability for applications designed to run on two servers at once.

The second use of clusters involves Sequent's soft-fail-over capability, which automatically switches files and applications from one server to the other if the first fails. The Symmetry 2000/990 offers additional fault tolerance features, including on-line disk replacement, redundant low-latency connections between nodes and more than 800G bytes of shared storage.

All models are available now. The standalone servers range in price from $85,500 for a Symmetry 2000/290 model with two Pentium chips and a 16-user DYNIX/ptx license to $801,600 for a Symmetry 2000/490 model with eight Pentium processors and an unlimited DYNIX/ptx license.

The cluster offerings range from $271,900 to approximately $1 million.

✆Sequent: (503) 245-0905.

See 1994's new networking products first

Traditionally, ComNet is the launching pad for new networking products and services. It's the first show of the year to showcase the latest technological innovations to help you achieve success in the global marketplace.

In the emerging era of global business, the rewards will go to the companies that interconnect widely dispersed LANs over wide area networks into enterprise systems.

Come to ComNet '94 and discover the networking products, technologies, and ideas you'll use to lead your company into the global age.

- Visit over 450 exhibiting companies and see more than 250 new products.
- Evaluate new high-speed bridges, multiprotocol routers, intelligent hubs, LANs, network management systems, wireless solutions and other hot products on the day they're introduced.
- Get the inside story on developing trends and technologies, like ATM, Frame Relay, FDDI, fast Ethernet, and more.
- Visit LiveNet, a real-world demonstration of advanced enterprise networking in action.
- See productivity-enhancing "anytime/anywhere" communications at the Wireless Pavilion.

A conference program that gives you the global perspective—and the tools to make informed buying decisions.

Choose from more than 20 in-depth tutorials, the Executive Symposium, and over 75 conference sessions to expand your knowledge of today's most critical networking issues. Topics cover the full spectrum of enterprise network products, technologies, design solutions and management methods.

COMNET '94
CONFERENCE & EXPOSITION

Entering the Global Age

January 24-27, 1994 • Washington, D.C.

You'll explore important policy and industry trends. And—new this year—ComNet '94 includes focused learning sessions on the Internet, wireless communications, and desktop applications. Learn from the best minds in the business like keynote speakers Andrew Grove, CEO of Intel, and Bob Metcalfe, the inventor of Ethernet.

Produced by IDG World Expo. Sponsored by *Network World* and *Computerworld.*

ComNet is produced and managed by IDG World Expo, the worldwide leader in professional conferences and expositions for the information technology industry...including ComNet Prague, EuroComNet and ComNet Korea.

ComNet is officially sponsored by *Network World* and *Computerworld*, both publications of International Data Group, the leading global provider of information services on information technology. IDG's research subsidiary, International Data Corp. (IDC), is the leading market research and analysis firm covering the computer field.

Send for your FREE Exhibits Etc.℠ Pass today.

There's no obligation. For FREE exhibit hall admission or conference information, return the coupon or call 800-225-4698.

☐ **Please send my FREE Exhibits Etc. Pass, a $50 value.**

This entitles me admission to see over 450 exhibiting companies, LiveNet, the Wireless Pavilion, the NetWare Pavilion, the keynotes and more. Also send detailed conference information so I can make a decision on attending the complete conference program. There is no obligation.

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY/STATE/ZIP _____

PHONE _____ INTERNET ADDRESS _____

Return to: ComNet '94, P.O. Box 9107, Framingham, MA 01701-9107. For fastest service, fax to 508-872-8237.

NW1

BRIEFS

The **California Public Utilities Commission (CPUC)** has decided to rescind its decision to allow local toll competition. The CPUC had voted in September to allow long-distance carriers and others to compete with local exchange carriers for intra-local access and transport area toll traffic as of the first of the year.

But the CPUC has decided that allowing industry members to help research the decision was a mistake. It still plans to allow local toll competition, but implementation will be delayed several months. The CPUC is currently investigating whether the decision-making process was compromised.

Infonet Services Corp. last week said it has completed a three-year replacement of NCR Corp. Comten 3690 packet switches with Siemens EWSP packet switches in 30 countries. The service provider began the project in response to increasing demand for X.25 service at 56K/64K bit/sec. The Siemens switches are linked to the carrier's backbone net, which comprises Network Equipment Technologies, Inc. IDNX switches linked using fractional and full-speed T-1 and E-1 lines.

Bell Atlantic Corp. and **Grupo Iusacell S.A. de C.V.**, the second largest carrier in Mexico, last week formed a strategic partnership under which the regional Bell holding company will acquire a 42% stake in Iusacell for $1.04 billion.

In addition to its cellular interests, Iusacell is licensed to provide traditional telecommunications services throught Mexico. The Mexican carrier also has joint ventures with administrations in several Latin American countries.

Iusacell, a large cellular provider in Mexico, owns 100% of the cellular license for Mexico City.

US West, Inc. last week announced that it will sell its paging unit, US West Paging, to San Diego-based Westlink Co. Terms of the agreement were not disclosed. US West said its future interests in the wireless arena will focus on two-way voice and data technologies, such as cellular and personal communications services.

WilTel International, the global services unit of WilTel, has announced plans to offer its WilPak frame relay service in London and Frankfurt, Germany, beginning in January. IDB Worldcom will provide international fiber links, while the telecommunications services division of Reuters, Ltd. will handle facilities management for the European half of the service.

Twenty-four vendors jumped on the **Novell, Inc.-AT&T** bandwagon at the recent NetWorld 93 Dallas conference.

Companies including Cheyenne Communications, Inc., Dialogic Corp., Electronic Information Systems, Inc. and VMX, Inc. announced that they have joined the Novell-AT&T Telephony Services Early Implementers Program and committed to provide products that work with the Telephony Services for NetWare, a suite of products for integrating phone services with local-area networks.

US West plots ATM course with planned expansion

BY BOB WALLACE

Denver

US West Communications, Inc.'s Advanced Communications Services (ACS) unit last week outlined a three-phase program that will position the carrier to provide ATM-based services throughout its territory in mid-1995.

US West's long-term plan is to build a two-tiered Asynchronous Transfer Mode network comprising scalable ATM access nodes from Newbridge Networks, Inc. that pass traffic to backbone switches linked using Synchronous Optical Network lines.

"We learned with frame relay that you just can't install big switches in major cities and expect users to flock to the service," said Joe Zell, director of services development for ACS. "We're using an inexpensive switch and will only deploy them close to companies that sign up for the service."

Analysts said that approach will enable US West to keep its equipment investment down, something that carriers have failed to do in the past.

"Carriers used to assume that the big switches would instantly justify themselves," said Tom Nolle, president of CIMI Corp., a Voorhees, N.J., research and consulting firm. "The problem with the big boxes was that they were too expensive to deploy for a small number of users."

US West's ATM announcement comes just a few months after Pacific Bell and BellSouth Corp. detailed their ATM plans for the next few years. The latter two carriers, however, plan to begin offering ATM services before US West's third-quarter 1994 target date for a controlled introduction.

The first phase of the US West plan requires the carrier to deploy the Newbridge switches with fiber lines linking them together. The switches support a variety of local- and wide-area network interfaces, including Ethernet, token ring, Fiber Distributed Data Interface and frame relay.

US West said users will eventually have the option of establishing either T-3 or 155M bit/sec Optical Carrier (OC)-3 links to the Newbridge switches.

Phase 2, which begins next month, calls for two separate trials of US West ATM services — one by a consortium of organizations in Boulder, Colo., and the

See **US West**, *page 31*

US West's ATM trial participants

Boulder, Colo. trial

- Amaranth Custom Photo Lab
- Apple Electronic Media Research Lab
- Cablelabs
- G.W. Hannaway & Association
- Knight-Ridder Information Design Lab
- National Center for Atmospheric Research
- National Institute of Standards and Technology
- National Oceanographic and Atmospheric Administration
- Sony Recording Media Lab
- University of Colorado

Oregon trial

- Oregon State University
- University of Oregon
- Portland State University
- Oregon Health Sciences University
- The state of Oregon

ATM = Asynchronous Transfer Mode

SOURCE: US WEST COMMUNICATIONS, INC.'S ADVANCED COMMUNICATION SERVICES, DENVER

Frame relay availability

AT&T

- Austria
- Belgium
- Denmark
- Finland
- France
- Germany
- Ireland
- Italy
- Luxembourg
- The Netherlands
- Portugal
- Spain
- Sweden
- Switzerland
- U.K.

SOURCE: AT&T, BASKING RIDGE, N.J.

BT North America

- Australia
- Belgium
- France
- Germany
- Hong Kong
- Italy
- Japan
- Malaysia
- The Netherlands
- Spain
- Sweden
- Switzerland
- U.K.

SOURCE: BT NORTH AMERICA, INC., SAN JOSE, CALIF.

Sprint

- Canada
- France
- Germany
- Hong Kong
- Japan
- U.K.

SOURCE: SPRINT CORP., KANSAS CITY, MO.

International frame relay poses problems

BY BOB WALLACE

Users looking to extend their frame relay networks beyond the confines of the continental U.S. can expect limited service availability, long provisioning intervals and high prices.

FERRERE

Although most of the carriers have long ago detailed plans to offer frame relay internationally and international service revenues are expected to skyrocket from $2.60 million in 1992 to $363.6 million in 1996, it's been tough sledding.

The biggest problem is availability. For instance, some carriers only want to extend frame relay to countries in which the service can be delivered over fiber transmission facilities.

JOHN THOMPSON

KAVAZANJIAN

"That knocks Eastern Europe, most of the Far East and many third world countries off the list," said Deb Mielke, a staff specialist with BT North America, Inc. "Most of them don't have a digital infrastructure, let alone fiber."

BT currently offers frame relay service in 13 countries in Europe and the Pacific Rim, as well as in Hong Kong. Sprint Corp. offers frame relay in seven countries (see graphic, this page).

"We can't offer frame relay to major countries like Mexico, China and Korea because they don't have fiber yet," said Vik Mehta, Sprint's global frame relay services product manager.

But BT's Mielke remains optimistic. "Several of these countries realize that to be part of the global economy and attract multinationals, they need a digital [network] infrastructure."

In extreme cases, BT will team up with the user and approach the appropriate carrier to try to convince them to install fiber to support that customer, Mielke said.

The availability question is an obvious factor in where companies decide to hub their international frame relay networks.

"Countries like the U.K., France and Singapore try to make the decision easy for users by offering advanced communications infrastructures," said John Kavazanjian, senior vice president of Kendall Square Research, a maker of massively parallel processing computers. "The ones that don't will lose."

Kendall Square Research uses a five-site international frame relay network from CompuServe, Inc. The U.K. will serves as its European frame relay network hub.

MEHTA

"Choosing a hub can be pretty simple because there are many aggressive countries out there that want you to put your [international network] hub in their country," Kavazanjian said.

THE LONG, COSTLY WAIT

Carriers say the next largest problem in international frame relay is long provisioning intervals.

"Bringing up a site in the U.K. usually takes about

See **Frame relay**, *page 30*

COMING SOON! LAS VEGAS CONVENTION CENTER, 2-6 MAY 1994.

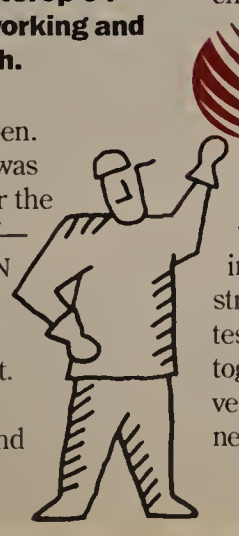
THE BEST AND THE BRIGHTEST. ALL UNDER ONE ROOF.

Introducing NetWorld+Interop 94—the most important networking and computing event on earth.

It's the show that had to happen.

NetWorld+Interop 94 was created specifically to mirror the changes in networking itself—the convergence of LAN, WAN and telecommunications in today's "information everywhere" business environment.

How do you satisfy user needs when products and technologies are constantly changing? How do you make buying decisions that stand the test of time? Seeing *all* your alternatives working in one place at one time is the only real way to find out.



Imagine, more than 600 of the world's leading networking and computing suppliers all under one roof. Demonstrating the latest technologies. Letting you test drive products and see them work together on the InteropNet™, a live multi-vendor, multi-protocol network that connects all vendors.

What's more, industry gurus will tell you about what's here now and what to expect. And university-level conferences and tutorials provide a chance to learn and exchange ideas with the industry's best and brightest.

And now, for the first time, NetWorld+Interop 94 will be held in five international business centers—Las Vegas, Berlin, Tokyo, Atlanta and Paris. No matter which one you attend, you'll see first hand how the world's most innovative products and technologies can give you a competitive edge.

All brought to you by Interop Company, the industry's premier producer of networking and computing events and exhibitions.

For information about attending or exhibiting at this unparalleled networking event, call 1-800-488-2883. Outside the U.S., call 415-941-3399, or contact us over the Internet at networld @interop.com.

Better than NetWorld. Better than Interop. It's one event you can't afford to miss.

BE THERE.

NetWorld®+Interop® 94 is produced by Interop Company.

Negotiation paramount in outsourcing deals

BY ELLEN MESSMER

Washington, D.C.

One key to the successful outsourcing of global networks appears to be creating bonds of understanding with the prospective outsourcing vendor before lawyers approve a contract.

Network managers at companies that have turned work such as network maintenance and international service provisioning over to an outside firm said users should expect months of protracted negotiations before concluding a global outsourcing deal.

In the early stages, both sides have to develop trust and realistic expectations before the lawyers charged with putting technical requirements into a contract inevitably introduce strife into the relationship.

"It's the model of the adversarial relationship," said John Cross, general manager of information technology at BP Exploration Co., Ltd., which earlier this year outsourced its network and computer operations at seven sites internationally to not one, but three outsourcing vendors under a five-year arrangement.

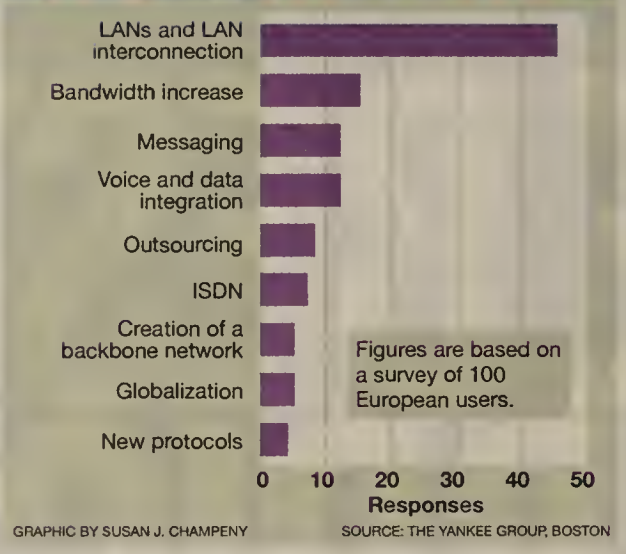
BP Exploration received more than 100 responses to its request for proposal for complete outsourcing of both its network and data centers, including hardware and software.

"We found only six [vendors] we felt could go the distance," Cross said. Because no single firm appeared ready to handle all of BP's outsourcing needs, the company took a novel approach.

It put representatives from the six vendors in a hotel for a week and told them to create an integrated service plan of which telecommunications was only a part.

This "hothouse," was to test "the empowerment of the organizations and their ability to make decisions on the fly."

What major changes will occur in your network during the next 5 years?



GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: THE YANKEE GROUP, BOSTON

ALLIANCE

Three vendors — the British outsourcing firm Syncordia Corp., San Diego-based systems integrator SAIC, Inc. and the computer support firm Sema Group of Birmingham, England — formed an alliance that won acceptance by BP officials.

Dedicating months to negotiations — and building rewards for good performance into the contract — led to a successful agreement. "If you rush into these things, you can probably expect to rush out as quickly," Cross said. "Don't outsource the problem."

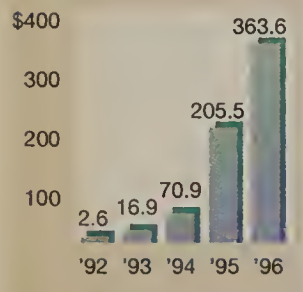
J.P. Morgan and Company, Inc., which spends $100 million a year on communications, has entered into outsourcing agreements with four providers for its global networking needs.

BT North America, Inc. handles J.P. Morgan's X.25 nodes, AT&T manages its international local-area network connections; and MCI Communications Corp. and Infonet Services Corp.handle the company's global transport and Systems Network Architecture net support.

Moore said users have to be armed with information about their own internal costs and the cost of network services when the negotiating starts. Encouraging competition among outsourcing vendors is a useful strategy, Moore said.

International frame relay takes off

Frame relay service revenues in millions of dollars



SOURCE: VERTICAL SYSTEMS GROUP, DEDHAM, MASS.

GRAPHIC BY TERRI MITCHELL

Frame relay

Continued from page 28

45 days, while adding sites in other European countries like Spain and Italy can take double that," Mehta said. "Turning up locations in the Far East, like in Hong Kong and Singapore, takes at least 50 days."

Mehta said these intervals are too long for U.S.-based multinationals. "Users aren't happy about waiting 90 days to add a site, but it's a problem that's largely beyond our control."

Ken Ferrere, AT&T's global frame relay product manager, echoed that sentiment. "It can take a long time — like about three months in Germany — to get a circuit, and that can be painful." AT&T currently offers frame relay in 16 Western European countries.

As if the wait isn't bad enough, frame relay links also cost more overseas than they do here, another factor stemming from lack of fiber.

While most U.S. carriers have fiber nets, networks in other countries are based on analog transmission facilities and carriers charge a premium for digital links.

"Users should take a hard look at the networks in the countries they want to extend their frame relay networks to," said Daniel Briere, president of TeleChoice, Inc., a Verona, N.J., consultancy. "That should give them a rough idea of what's in store for them in terms of provisioning and pricing."

GTE to launch flat-rate LAN interconnect service

BY BILL BURCH

Washington, D.C.

GTE Corp. next month will launch a flat-rate, T-1 metropolitan-area LAN interconnection service in five states intended to help the carrier fight off the threat posed by competitive access providers' (CAP) fiber rings.

GTE's new MetroLAN offering is also based on metropolitan fiber rings but will extend via GTE central offices to buildings beyond the reach of the rings — and at attractive rates. Per-port charges for the T-1 service will start at $50 per month for customers with one-year contracts; users willing to sign up for five years will pay $37 per port a month.

"MetroLAN is an answer to a competitive threat," said Ken Thornbury, a product manager for business networking services at GTE Telephone Operations.

Like other local exchange carriers, GTE faces the loss of data transport revenues to LAN interconnect services offered by CAPs. GTE plans to win customers for T-1 transport on its fiber rings, then migrate the users to frame relay and Switched Multimegabit Data Service as that service becomes available, Thornbury said.

MetroLAN service contracts will run for one, two, three or five years. Although the service is currently sold in T-1 increments, GTE plans to eventually offer connectivity at native LAN speeds, according to Thornbury.

Despite the launch of the new flat-rate pricing, GTE plans to continue to offer traditional per-mile pricing for T-1 links.

The new flat-rate pricing should appeal to current T-3 users that might consider buying T-1 connections in bulk. T-3 customers with connections spanning 10 miles or more should benefit from the flat-rate service, Thornbury said, as would customers using less than 20 T-1s' worth of capacity on their T-3 connections.

Initially, GTE will offer T-1 access in five states, with launches planned in seven other states as additional rings come on-line.

"MetroLAN is an answer to a comptetitive threat," said Ken Thornbury, of GTE Telephone Operations.

The service will premiere next month in Bellflower, Covina, Lakewood, Ontario, Santa Monica, Westminster and Whittier, Calif.; Clearwater and St. Petersburg, Fla.; Durham and Research Triangle Park, N.C.; Beaverton and Portland, Ore.; as well as Everett, Wash.

The MetroLAN launch comes as GTE begins the deployment of 50 fiber rings in 12 states (*NW*, June 21, page 30). The carrier will be spending $240 million on the fiber rings over the next several years.

RATE & TARIFF MONITOR

by David Rohde

Some carriers bear a close look

Don't be fooled by the truckloads of new tariffs flowing into the FCC resulting from the new mandate for every interstate carrier to file rates — not all of them are dripping with revelations about innovative new services. In fact, most of America's up-and-coming long-distance carriers are promoting services that dovetail the categories of service previously established by the Big Three.

But if you look closely, you might find some terrific opportunities in the areas of volume discounts and flat-rate pricing. And depending on your traffic patterns, you might find a regional carrier is your best bet because some skew their pricing to give especially low rates if they can both originate and terminate a call.

In checking out a second-tier carrier's tariff, it helps to have your antenna out for marketing buzzwords. For example, anytime you see the word "plus" in a service name, you're probably looking at a toll service accessed over regular local exchange lines and offering only slight discounts off basic commercial dial-1 rates.

Consider Litel's Vista Plus service. It offers daytime rates ranging from 17.49 cents to 27.80 cents per minute, with minimal reductions for evening usage and no further cut for night/weekend calling. There's a $5 subscription charge as well as some term and volume discounts. You can also buy $5 Project Accounting Codes to track who's calling where. But the Vista Plus pricing scheme bears little relationship to Litel's similar-sounding Vista WATS service, which offers rates as low as 11.09 cents per minute for daytime and 7.3 cents per minute for evenings in exchange for you buying dedicated access to Litel's point of presence.

Or consider Allnet's Maxcess "family of services." Maxcess I is designed for high-volume users, and T-1 access is required (well, not required, but you have to have no fewer than 17 voice grade equivalent channels). Maxcess II is designed for moderate-volume users using analog dedicated access lines. Maxcess III is a Pro WATS-type service using switched access. Look at the difference in rates, keeping in mind that dedicated access will eat into some of the savings: A 250-mile daytime call costs 11.9 cents per minute on Maxcess I, 13.3 cents per minute on Maxcess II and 21.59 cents per minute on Maxcess III.

Metromedia's equivalent of Maxcess I and II is a service with the same name either way: Dedicated WATS. Its tariff simply lists two different rate tables, depending on whether the access line is T-1 or analog. The 250-mile rates here are 11.34 cents per minute with T-1 access and 12.07 cents per minute with voice-grade access.

Many of the twists on these carriers' switched services tend to come at the lower end of the scale. Flat-rate or "postalized" rate schedules — one price to go anywhere, just like the post office — probably wouldn't appeal to the Fortune 500. But there are some interesting deals.

Litel's All-America Plan allows you to call anywhere in the continental U.S. for 17 cents per minute

See **Carriers**, *next page*

Users choose ARDIS offerings to automate dispatch services

Companies plan to keep better track of mobile personnel.

BY ELLEN MESSMER

Washington, D.C.

Liebert Corp. and Willett Freight Services have picked ARDIS Co. packet-data services to automate the dispatch services each uses to keep track of on-the-go personnel.

Liebert, the Columbus, Ohio-based manufacturer of uninterruptible power supply equipment, early next year will equip its field technicians with hand-held devices capable of sending and receiving service call information.

"Right now, the service engineers have to fill out paperwork and call into the service center," said Lois Gagle, Liebert's project coordinator. "This will eliminate the phone calls and the paperwork."

Dispatchers taking service requests will use terminals to enter data into an IBM Application System/400 minicomputer. The AS/400 will run field service software supplied by Service Systems International, Inc. and act as a gateway to the ARDIS radio-based network.

Liebert has 250 technical support engineers throughout the country, but only about 10 engineers will be part of the initial pilot using ARDIS. If all goes as planned, Liebert will extend the network nationwide during the next year.

Willett Freight, the Burr Ridge, Ill.-based trucker that delivers to a five-state region, is currently bringing the ARDIS network on-line for its dispatch application.

Willett Freight has equipped each delivery driver with the Itronix, Inc. T3500 hand-held computer, which can send and receive pickup and delivery information by communicating with an IBM RISC System/6000 system at the company's dispatch center.

Both the Itronix devices and the RS/6000 run dispatch application software from Carrier Logistics, Inc. of Elmsford, N.Y.

Willett Freight is the first customer for ARDIS' TransportationExpress, a service and equipment package that includes project management, installation and training.

Under TransportationExpress, companies pay a monthly fee, which starts at $15 per day per truck, for use of the ARDIS service and the equipment.

"It's a 31-month operating lease arrangement," said Ardis market development manager John Page. The customer does not own the equipment at the end of the period, but a purchase option is available.

Willett Freight dispatchers, which have already begun using the ARDIS service, find drivers are able to make more daily stops because relaying information over the wireless network is far more efficient than using the company's older two-way voice radio system.

"Before implementing TransportationEXPRESS, our drivers experienced delays in getting crucial delivery information," Willett Freight Services president Ron Hettrick said.

US West

Continued from page 28

other by a group of state universities and government agencies in Oregon.

The second phase will also include the extension of existing joint marketing programs — and the creation of new ones — under which US West will be able to offer turnkey ATM packages to users. US West already has agreements with ACC, ADC Kentrox, Cisco Systems, Inc., Motorola Codex, SynOptics Communications, Inc. and others for equipment to be sold with its frame relay services.

US West will issue a request for proposal for a backbone ATM switch and form an ATM customer committee.

In conjunction with the University of Minnesota, Honeywell, Inc. and the Multi-Dimensional Applications and Gigabit Network Consortium, US West is currently testing backbone switches made by AT&T Network Systems, Fujitsu, Ltd. and Siemens AG.

In the final phase, which will begin in the third quarter of 1994 and run for six months, US West will evaluate the results of the two trials and then begin a controlled introduction of ATM services, with pricing handled on a customer-specific basis.

US West will also begin deploying the backbone switches and linking them with 622M bit/sec OC-12 lines. The carrier will enable users to access a backbone switch using OC-3 or OC-12 links.

Carriers

Continued from previous page

daytime, 14 cents evening and 12 cents night/weekend. Calls to Alaska and Hawaii are 25 cents per minute at all times. Metromedia uses the term "ExactCall" to promote its postalized plan. ExactCall Plus (low-volume switched access) gets you anywhere over 165 miles for 22.5 cents per minute, while ExactCall WATS (dedicated access) runs 13 cents for per minute.

Check out services that take advantage of where a regional carrier is strongest. Instead of traditional mileage-sensitive rating tables, some carriers borrow the virtual network concept of calling "on network" and "off network" to set up two price schedules for the same service, depending on whether your call terminates in your carrier's territory. Other services offer pricing that may benefit you if, say, virtually all your calling goes to big cities.

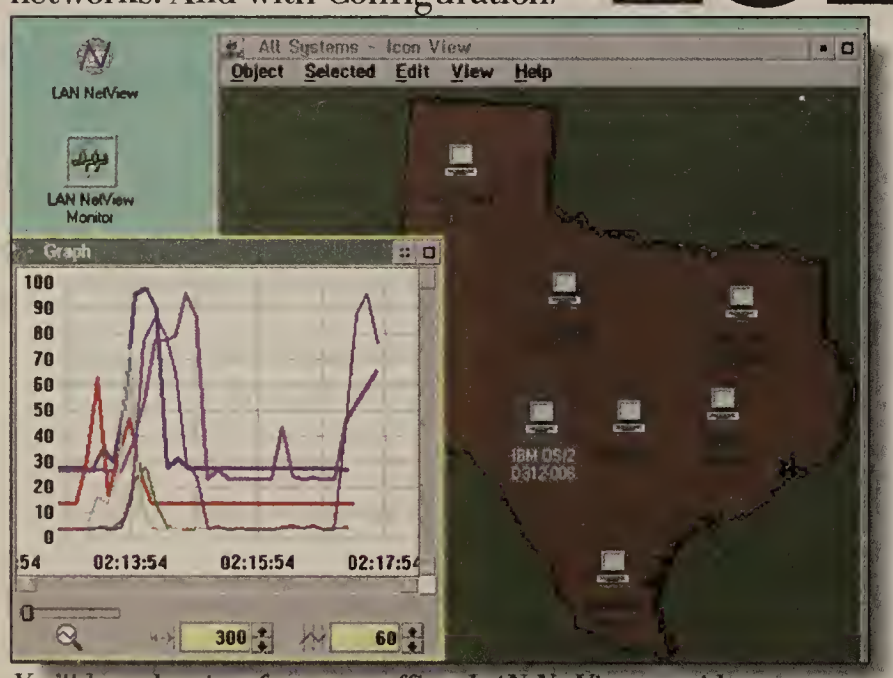
Rohde is associate publisher of the Center for Communications Management Information in Rockville, Md., a provider of rate and tariff information. He can be reached at (301) 816-8950, Ext. 292.

We've created a new position for LAN managers.

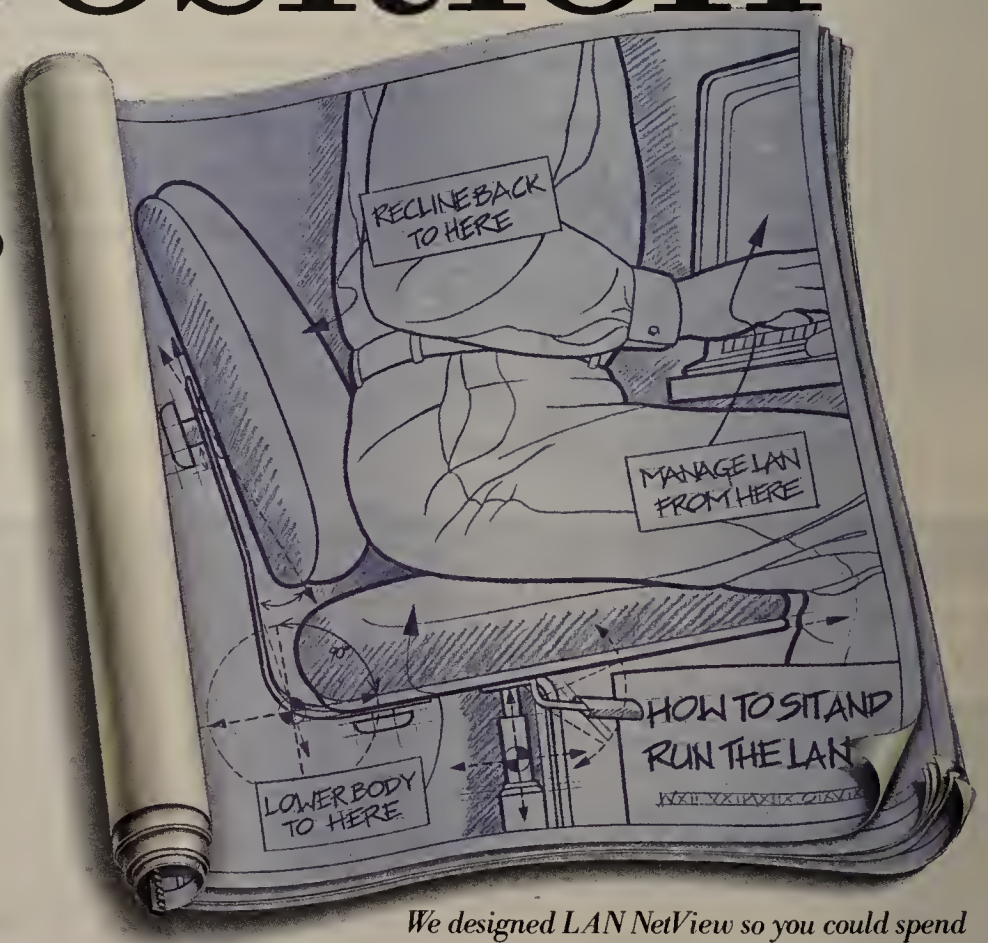
Introducing LAN NetView

Pull up a chair. Make yourself comfortable. You've just been promoted to Chairman of the Network! Introducing the LAN NetView® family of OS/2® LAN management tools. Now you can manage your network with a single, consistent user interface, without leaving your seat.

LAN NetView Fix informs you of problems and recommends how to fix them. If you're not at your desk, it will even call your beeper! LAN NetView Monitor lets you stop problems—like dangerously full disks—before they happen. LAN NetView Tie lets you selectively link to your host system. LAN NetView even lets you track hardware and software configurations, so you can better manage your networks. And with Configuration/Installation/Distribution, you can load software from a single, central code-server station, and really give SneakerNet the boot.



You'll love the view from your office: LAN NetView provides a single, integrated view of your system, from anywhere.



We designed LAN NetView so you could spend more time with your most neglected piece of office equipment. Your chair.

LAN NetView is based on open industry-standard architectures and technologies. It can manage LAN Server and NetWare® servers, OS/2, DOS and Windows™ clients, and other critical network resources and devices. And LAN NetView is backed by superior IBM service and support. To find out more, call **1 800 3-IBM-OS2.** In Canada, call **1 800 465-7999.** This could be the management position you've always wanted.

We're in the business of connecting yours.

IBM®

New IBM client/server application development tools

VisualAge
- Works as a graphical user interface-based tool
- Supports SmallTalk object-oriented language
- Acts as an object repository for team development of large applications

Highpoint (code name) – Planned product
- Enables host programmers to build high-end client/server applications, such as those for transaction processing

ReDiscovery
- Allows users to find and track reusable code so it can be used to build new applications

GRAPHIC BY SUSAN J. CHAMPENY SOURCE: IBM, WHITE PLAINS, N.Y.

IBM to enter client/server app tool market

BY BOB BROWN

White Plains, N.Y.

IBM's Software Solutions Division last week introduced VisualAge, a new object-oriented client/server application development tool designed to let users build applications that can access data across multivendor networks.

The company also announced plans to deliver a product, code-named Highpoint, that will help users moving off host systems to build transaction processing applications for client/server environments. IBM also discussed a new tool, dubbed ReDiscovery, that will let users package existing COBOL code as objects to be reused in other applications.

According to Catherine Lewis, programming systems director of application development marketing at IBM , the new software is part of Big Blue's new application development focus on client/server computing. Historically, IBM has offered host-based application development software.

VisualAge, which was code-named Camelot, is a graphical user interface-based object builder and application development tool that is designed to speed development through reusable code. The software is based partly on the Smalltalk object language and features an object repository developed by Object Technology International, Inc. that enables team development.

VisualAge masks the object language for developers that choose not to use it by letting them drag and drop icons representing objects on a screen to build applications.

The product, which initially will be available on OS/2, will be sold in both individual and team versions. VisualAge Team will enable developers to share objects stored in the repository, which can be situated on a variety of network servers, including Novell, Inc. NetWare, IBM LAN Server and Microsoft Corp. LAN Manager servers.

Team development is usually key to building enterprise applications, said Scott Bosworth, product manager for VisualAge in Cary, N.C.

While other development tool vendors are boasting about their team development features, IBM said it believes its tools are superior because it offers a fine-grained object repository (that allows for very specific elements to be defined as objects) and ver-

See **IBM**, *page 34*

OMG and Microsoft stymied by conflicting object models

Microsoft suggests DCE link for interoperability.

BY WAYNE ECKERSON

While the Object Management Group (OMG) and Microsoft Corp. agree they need to work together to ensure the interoperability of their respective object computing models, the two sides have yet to resolve their differences.

The stakes are high because unless OMG and Microsoft reconcile their architectures, users will be forced to choose between the two object models when building next-generation distributed computing applications or rely on proprietary gateways to interconnect the two environments.

This will inevitably slow the growth of object-based computing, which promises to ease the complexity and costs of building enterprise network applications that can evolve gracefully as business needs change.

OMG is currently hammering out Version 2.0 of its Common Object Request Broker Architecture (CORBA), which will specify how object request brokers from different vendors interact. An object request broker is a mechanism that manages the exchange of messages between objects across a network.

Microsoft Corp. has shipped 4,000 OLE 2.0 developers' tool kits and 250 beta kits for a Macintosh version of OLE 2.0. It has also licensed OLE 2.0 to several Unix software vendors.

Microsoft's Common Object Model forms the core of its Object Linking and Embedding (OLE) 2.0 technology and future object-oriented operating system, dubbed Cairo, both of which will support remote object invocation.

"The prospects of interoperability between Cairo and the rest of the world are slim to none if Microsoft doesn't follow what OMG is doing. [Microsoft] could solve a lot of headaches if they just did an [OMG Interface Definition Language] implementation [of their object model]," said Chris Stone, president of OMG.

OMG's Interface Definition Language is a high-level language similar to C that provides users with a standard way to define object interfaces.

Companies shipping distributed computing environments that comply with the Object Management Group's Common Object Request Broker Architecture:

Company	Environment
Digital Equipment Corp.	ObjectBroker - formerly Application Control Architecture Services
Hewlett-Packard Co.	Distributed SmallTalk and ORBPlus
HyperDesk Corp.	Distributed Object Management System
IBM	Distributed System Object Model
Iona Technologies, Ltd.	Orbix
SunSoft, Inc.	Project Distributed Object Environment

WOEFULLY INCOMPLETE

While Microsoft officials agree that one way to achieve interoperability is to map their Interface Definition Language implementation to OMG's, they say such a mapping would not guarantee interoperability, primarily because the CORBA specification is woefully incomplete.

They said a better way to achieve interoperability is for OMG and CORBA vendors to adopt Microsoft's object-enabled remote procedure call (RPC), which is based on the Open Software Foundation, Inc.'s Distributed Computing Environment (DCE).

In this way, products based on either architecture would use the same over-the-wire protocols, which is critical for any real interoperability, said Mark Ryland, a senior program manager in Microsoft's Windows NT group. "If you don't specify the implementation, you are guaranteed not to be interoperable. The DCE RPC is the best mechanism to achieve such interoperability," he said.

Microsoft's conundrum, however, is that it cannot afford to rewrite OLE 2.0, which is

See **OMG**, *page 34*

BRIEFS

Verity, Inc. and **Aurum Software, Inc.** have announced a joint sales and marketing agreement that will feature Verity's TOPIC document retrieval software working in conjunction with Aurum's Customer Resource Planning System.

The alliance will target automated customer support and help desk applications based on the two products. TOPIC's full-text search and retrieval capabilities will be combined with Aurum's automated customer processing to provide a system that can efficiently sort through thousands of pages of product documentation, call reports, bug reports and other text-based support data. The companies will share sales leads with each other and develop joint marketing programs.

Verity: (415) 960-7600; Aurum: (408) 562-6370.

The SQL Access Group has announced the election of Jon Deutsch, technical director at Information Builders, Inc., as the new chairman of the group's executive board. Deutsch will be responsible for heading the development of the SQL Access Group business plan, pursuing consensus among participating members, and promoting the SQL Access Group organization and specifications. The SQL Access Group is an industry consortium dedicated to promoting database interoperability and portability.

SQL Access Group: (603) 434-0802.

Calculus, Inc., based in Deerfield Beach, Fla., has announced OutPost, a hardware and software product designed to provide remote electronic mail users with a visual or audio alert that they have E-mail waiting. Typically, remote E-mail users need to poll a central E-mail server to find out if they have received any messages. OutPost is designed to run with Message Handling Service E-mail systems. The Calculus product consists of the OutPost Remote Service Unit and accompanying remote terminal software that costs $299, as well as gateway software that costs $199 for 10 mailboxes.

Calculus: (305) 481-2334.

InSoft, Inc. recently announced the shipment of InSoft Network Television (INTV!), which allows users of Sun Microsystems, Inc. workstations to receive broadcast-quality video and audio data across high- and low-speed Transmission Control Protocol/Internet Protocol networks. INTV! requires workstations to be configured with InSoft's Digital Video Everywhere software and standard television cabling. INTV! 1.0 runs on Solaris 2.0 and costs $4,995 for the server software (not including a video card). The client software costs $995 and does not require a video card, and an INTV! kit with video card for the server costs $5,995.

InSoft: (717) 730-9501.

Fujitsu Networks Industry, Inc. recently announced DeskTop Conferencing Version 1.3, which allows multiple Windows personal computer users to share and update applications across a Novell, Inc. NetWare and Integrated Services Digital Networks nets. The new version contains several enhancements to improve the tool's performance, installability and support for remote users. Version 1.3 costs $299 for a single-user pack with discounts for volume purchases.

Fujitsu: (203) 326-2723.

OMG

Continued from page 33

already shipping, or delay its deployment schedule for Cairo just to ensure that its object model remains compatible with CORBA.

"We will not wait for OMG technology to solidify before shipping products," said Alistair Banks, manager of technical evangelism in Microsoft's developers' relations group.

OMG's Stone, however, said his organization is not lagging behind Microsoft. Rather, it has taken a different approach and is likely to end up with a completed environment at the same time or earlier than Microsoft.

"We are working from the infrastructure level upward," Stone said. "They are working from the application layer downward."

The two sides may have one last opportunity to coalesce their object models later this year when OMG issues a request for proposal for object linking and embedding services (*NW*, Oct. 11, page 1).

While OMG originally was not going to tackle OLE services until the middle of next year, it pushed the date up to give Microsoft the opportunity to write a CORBA interface into its architecture before the architecture is fully defined, said John Rymer, vice president at Patricia Seybold Group, Inc., a Boston-based research and consulting firm specializing in information technology.

This interface, if made public, would provide a means by which users could link OMG's CORBA to Microsoft's distributed object computing services.

"The OMG RFP represents the last best chance for OMG and Microsoft to strike a compromise," Rymer said.

Microsoft's Ryland said Microsoft has not decided whether it will submit a proposal to OMG or how and when it might accommodate CORBA within its own object model.

IBM

Continued from page 33

sion control, among other things, said Martin Nally, chief architect of VisualAge.

Aaron Zornes, an analyst at META Group, a Westport, Conn., consulting firm, said the inclusion of an object repository in VisualAge will make the software "better suited for large-scale or business-critical applications than current product offerings from Powersoft [Corp.], Gupta [Corp.] and Microsoft."

VisualAge will provide native access to IBM's DB2 products but will also include ways to access Oracle Corp. and Sybase, Inc. databases. IBM will support database interfaces such as the Integrated Database Application Programming Interface and Microsoft's Open Database Connectivity as they gain more industry support, Bosworth said.

Network protocols supported will include Advanced Program-to-Program Communications, High Level Language Application Program Interface, Network Basic I/O System and Transmission Control Protocol/Internet Protocol. The first release of VisualAge will also support IBM's Systems Object Model, an object request broker, Bosworth said.

VisualAge on OS/2 will begin shipping to selected users by November and will be generally available early next year. The individual version of the software will cost $2,500 per developer, and the team version will cost $5,000 per developer.

VisualAge will be extended to Windows shortly after availability of the OS/2 version and will be ported to IBM's AIX and other vendors' versions of Unix after that.

IBM also announced plans for an upgraded fourth-generation language product, code-named Highpoint, that will address the needs of professional programmers whose companies are moving away from hosts to client/server architectures. This software will enable users, for example, to build CICS applications for client/server systems. The software will use mainly procedural code but will come integrated with some of VisualAge's visual programming capabilities.

Other details were unavailable.

Judith Hurwitz, president of Hurwitz Consulting, Inc., a Watertown, Mass., consulting firm, said VisualAge will let users build enterprise applications but that Highpoint should take them a step further. That is something other vendors in this market cannot offer because they have little experience addressing the enterprise-level needs of users, she said.

Building on that, IBM's ReDiscovery will let users take existing COBOL source-code libraries and create reusable components that can be used under VisualAge or other development tools.

The software will also provide a search capability that will help users select which pieces of legacy code they should reuse and keep track of them in formal catalogs, according to Lewis.

"What that will allow you to do is not have to start from scratch in building applications, but rather will let you build parts from existing legacy systems and then use those parts in the construction of new client/server applications," she said.

ReDiscovery will be available in November on a limited basis and generally available shortly afterward. IBM has not disclosed pricing yet.

IBM: (800) 426-2255.

Partitioned database primer

BY PETER LISKER

With Oracle Corp.'s recent announcement of its Parallel Query Option and the imminent introduction of parallel processing-capable database offerings from Sybase, Inc. and Informix Software, Inc., the stage is set for another jargon-filled foray into technology.

One key concept for network managers to understand in the move to parallel database processing is partitioning — in essence, dividing up a database to run on multiple disks and processors on one or more machines. Database partitioning has ramifications not only for network design — ensuring that a network has the capacity to handle increased communications among databases — but for network and systems management, as well.

The most basic kind of partitioning is to split the database to run on multiple local or remote disks. This so-called physical partitioning is supported by most vendors and is a valuable feature as databases expand in size and complexity.

But more important and complex is the job of partitioning information from a logical standpoint: making a partitioned database appear to applications as if it were residing on a single disk and machine.

The advent of parallel processing is increasing the awareness and the need for partitioning, which will become a key factor in database performance. Case in point: Imagine a customer information database that supports parallel queries. If processors must repeatedly access a single data storage system, performance will lag. Effective partitioning can improve performance and response time.

Database vendors have adopted a couple of different approaches to handling database partitioning. One approach, favored by Informix, is to build the partitioning intelligence into the database itself. The database engine maintains information on the logical and physical aspects of the distributed database and shuttles parallel queries to the appropriate location for processing.

Some analysts say this approach is well-suited for a database running on a symmetric multiprocessing machine.

An alternative approach, taken by Sybase in its upcoming Navigation Server product, is to keep the partitioning code separate from the database engine itself. This obviates the need to build the logic into each copy of the database and may be more useful for users distributing databases across multiple machines.

Which approach is best? That depends on your environment. In a symmetric multiprocessing environment where there are multiple processors in a single box, the Informix approach may be a good fit. The database engine can apportion queries to individual processors linked to disks with the needed data. Informix believes this approach will be very popular given the large number of customers it expects will run database systems on symmetric multiprocessing machines.

Sybase believes distributed databases are the coming wave and that supporting partitioning across the network is a key for users. Each machine will run a separate SQL Server that works with the central Navigation Server.

Partitioning could have major consequences for your net. If data is distributed throughout an enterprise on partitioned databases, there could be a big hike in net traffic for such things as database synchronization. Also, database backup, recovery and administration will become more complex than in a single-machine environment. Vendors will have to develop products that aid in those chores.

DEVELOPMENT TOOLS

Uniface makes a stronger CASE connection

BY BOB BROWN

Alameda, Calif.

Client/server development tool supplier Uniface Corp. will announce today a new strategy and products for integrating its software with computer-aided software engineering (CASE) products.

The key component of Uniface's Enterprise CASE Initiative is its CASE Enablement Pack, which is an existing Uniface CASE Bridge — a link between the Uniface development and CASE software — bundled with a new Model Synchronizer designed to synchronize changes between CASE and Uniface application repositories.

Uniface, like other client/server tool vendors, is increasing its emphasis on CASE integration to help users build enterprise net applications.

OTHER TIES

Uniface, based here, will also announce links between its development software and CASE tools from Computer Systems Advisors, SoftLab AG, Texas Instruments, Inc. and Westmount Technology BV.

Uniface also supports CASE software from Andersen Consulting, Cadre, CAP debis, Cap Volmac Tools, Digital Equipment Corp., Interactive Development Environment, Inc., Interprogram, Intersolv, Inc., KnowledgeWare, Inc., LBMS, Inc., Oracle Corp., and Popkin Software and Systems, Inc.

Uniface, like other client/server development tool vendors, is placing an increased emphasis on CASE integration as a way to help users build enterprise network applications.

CASE tools aid in designing blueprints for complex applications that need to be well thought out in advance, while client/server tools, such as Uniface, handle application development, deployment and maintenance.

DATA MODEL ADVANTAGE

Helena Winkler-Parenty, CASE marketing manager for Uniface, said Uniface and CASE tools work well together because both are based on data model architectures. Data models allow for applications to be based on a consistent architecture across a network, she said.

The Model Synchronizer, which can run on Microsoft Corp.'s Windows, IBM's AIX and Sun Microsystems, Inc.'s Sun OS, ensures that any changes to the CASE or Uniface data models are mirrored in the other system. The Model Synchronizer, CASE Bridges and data models all typically reside on the same server but can run on separate systems.

"Synchronization of the data is important since companies tell us they typically spend more money on maintenance of applications than they do in initially developing them," Winkler-Parenty said.

CASE Enablement Packs are available now and cost between $3,000 and $15,000.

Judith Hurwitz, president of Hurwitz Consulting, Inc., a Watertown, Mass., consulting firm, said she is encouraged by the collaboration between CASE and graphical user interface (GUI)-based client/server application development tool vendors.

"CASE tools went into disrepute because the vendors always assumed a mainframe environment and the tools were hard to train people on," Hurwitz said. "But users building large client/server applications need the infrastructure in place that CASE tools can provide. So if you can put the GUI tool and CASE tool together, you've got a nice marriage."

✆Uniface: (800) 365-3608.

ELECTRONIC MAIL

by David Ferris

Lotus and Microsoft hang on to E-mail reigns

Two products dominate the personal computer and Macintosh E-mail market: Lotus Development Corp.' cc:Mail and Microsoft Corp.'s Mail for PC Networks.

According to a recent Ferris Networks survey of 100 large organizations with over a million mailboxes, the products account for around 75% of the mailboxes in the top U.S. companies. The crumbs are divided among various other vendors, led by Da Vinci Systems Corp.'s eMail.

Since personal computers will be the dominant platform for the next few years, will the future of electronic mail amount to the history of cc:Mail and Microsoft Mail?

FOLLOW THE LEADER

Market leaders, especially good ones with a significant lead, are usually difficult to dislodge. It's easier to hire people who know the products, and these people cost less. Leading vendors have higher revenues, so they can afford more R&D. What's more, because the products are widely used, there's less chance you'll end up with an obscure, buggy system. Last, but not least, by going with a leader, you lessen the chances of having the product disappear on you shortly after deployment. Recent Wang Office users may appreciate this point.

But neither Lotus nor Microsoft can sleep easy.

Lotus' biggest problem is upgrading its administration tools and the way it moves messages about. Today, if you want to build a cc:Mail network with 20,000 mailboxes, you'll have real headaches, mainly associated with reliable delivery and directory propagation. Admittedly, the headaches are a lot less than those of competing products.

The trouble is that cc:Mail code has been prodded, pushed and pulled for many years, so it's time to give it a major overhaul. At its September user conference, Lotus delivered an excellent description of future requirements for PC mail systems. Unfortunately, most of the details must still be worked out. Determining the right software architecture will require much intelligence and good guessing. It will be easy to stumble.

Microsoft has other challenges. The company has defined its way forward toward an X.400 backend and support of the Messaging Application Programming Interface and Service Provider Interface. The picture is an attractive one.

The big question is whether Microsoft will deliver adequate software in a reasonable amount of time. Things are already behind schedule, and the company's history with systems software does not inspire confidence. Think of the attempts to migrate from DOS to a proper multitasking operating system or the protracted gestation of Windows.

Who else might be invited to the main dining table?

WordPerfect Office, for one. For many users, the new Version 4.0 is substantially better than other E-mail products. Notable features include the very tightly integrated mail, group scheduling and task management, and message tracking. Also, the internal architecture should provide a good foundation for the next five years' enhancements. Expect the product to become a leader.

Novell may also change the picture. So far, NetWare Message Handling Service (MHS) and its sister NetWare Global MHS have had, like WordPerfect Office, little corporate success. However, Novell owns the network operating system business and has two advantages:

■ NetWare's directory is being enhanced to include E-mail directory information. In addition, it is being turned into a distributed directory, which makes local directory information available throughout a corporate network. Directory propagation will be handled by NetWare, and E-mail support staff will be relieved of a major burden.

■ Novell is talking about using NetWare to route messages, which makes sense. NetWare MHS could end up relieving E-mail experts of the time-consuming task of providing for the routing of messages.

The battle for market leadership is far from over. Interesting times lie ahead for us all.

Ferris is president of San Francisco-based Ferris Networks, a networking and E-mail research firm.

Editorial

Why is it that the more vendors talk about how important networking has become, the more the exhibit floors at the major conferences have come to resemble birthday time at Chuck E. Cheese?

Stop by their booths and vendors will fill your ear with talk about supporting mission-critical applications while shoving a cheap, plastic hard hat or an oversalted bag of popcorn in your fist. Does anyone else see the incongruity here, or have I lost my sense of humor?

Let me cite a few examples from NetWorld 93 Dallas — these companies are all big and they can take it.

* Banyan boasted a leather-clad tough astride a fake motorcycle, doing a poor impression of "The Fonz," discussing the benefits of Enterprise Network Services. (Enter to win your own Harley!)

* IBM offered the Flying Karamazov Brothers, who could juggle to beat the band but didn't offer much insight into LAN management.

* GTE gave us the video saga of honest Dwight Do-It-Right struggling to save heroine Melle from the clutches of a mustache-twirling villain.

I won't even get into Olicom's card sharp, Thomas-Conrad's Client/Server University or Brightwork's faux police station.

With training budgets shrinking, conferences are a rare opportunity to learn about technology. Why do users have to deal with this fluffy stuff to get information?

I asked the vendors and was told: "It brings them into the booth." Sure, for five minutes. But they leave when they can't find someone who can answer technical questions. I, for one, am tired of being told that the one person who could answer my question just happens to be out of the booth at the moment. Booth personnel have to be able to do more than get a name tag imprint.

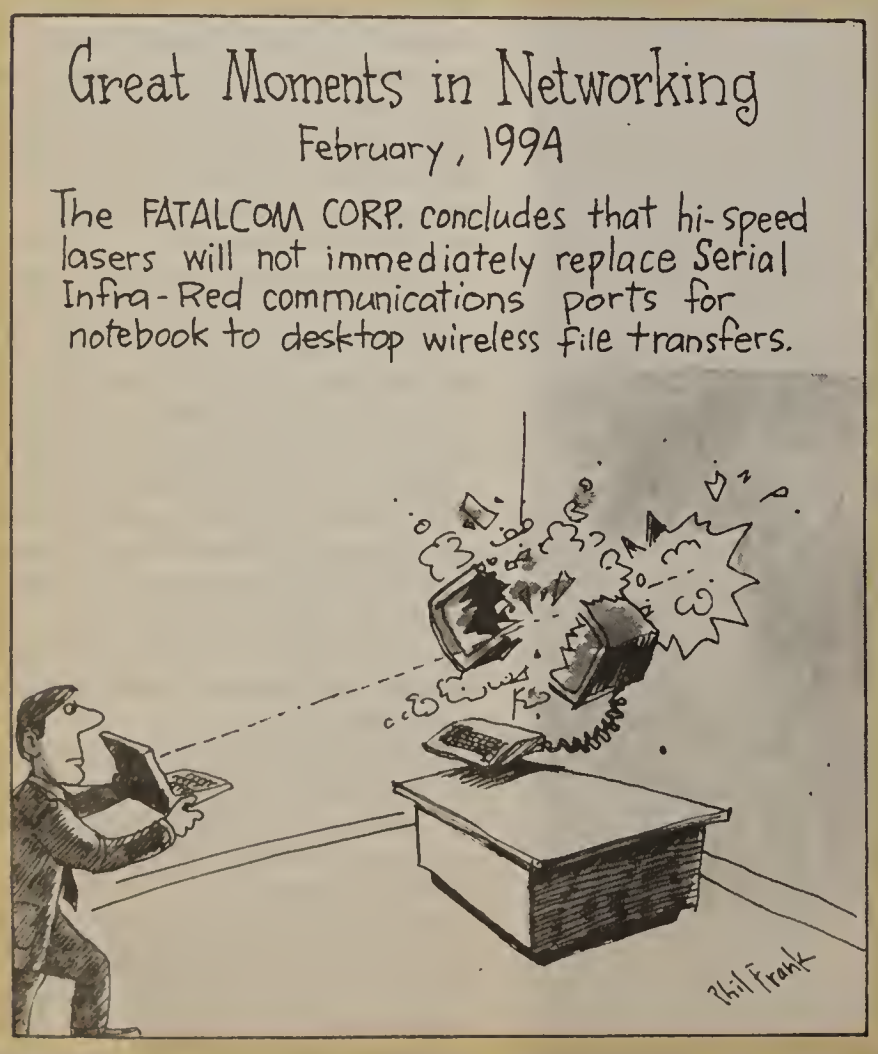
Vendors ought to take the dollars they're pouring into this glitz and redirect it into training their booth staffs and producing some top-quality educational materials for attendees to take home. If you have to be theatrical, how about putting on a multimedia primer on a key technology like ATM or Ethernet switching? Or solid product demos (kudos to Lotus and Microsoft)?

If you must give something away, spring for some books or video tutorials, or demo software. Skip the funny pens and cute pins. That's not the way to be remembered when you're trying to win a piece of the enterprise.

JOHN GALLANT

Teletoons

FRANK AND TROISE



DATABASE UPDATE

by Richard Finkelstein

Windows NT may be KO punch in client/server battle

Now that Windows NT is shipping, Microsoft Corp. will once again try to challenge Novell, Inc.'s dominance in the network operating system market — and this time Microsoft looks like a very formidable challenger.

Microsoft has put together a complete client/server solution from desktop to server. On the server side, the Windows NT operating system comes with integrated network protocols, including the Network Basic I/O System Extended User Interface (NETBEUI), Transmission Control Protocol/Internet Protocol and Internetwork Packet Exchange/Sequenced Packet Exchange (IPX/SPX), and built-in local-area network file and print services in the form of LAN Manager. Microsoft dominates the client side of the network with its Windows desktop operating system as well as its own client front-end tools, such as Visual Basic, Access and Excel.

Anchoring Microsoft's enterprise solution is the Microsoft/Sybase, Inc. SQL Server database server. To ensure rapid adoption of Windows NT as a database server platform, Microsoft has worked hard to make SQL Server for NT the best in its class.

Microsoft's goal is twofold. First, Microsoft would like to entice current SQL Server users away from OS/2.

Second, and more strategically, Microsoft would like to break into new territory by attracting NetWare and Unix database server users to Windows NT. Microsoft is also betting that the low cost of SQL Server for Windows NT and the prospect of single-company support for both the client and server platforms will make up for Novell's substantial lead in the overall server marketplace.

SQL Server for Windows NT, priced at less than $15,000, will probably cost less than one-third the price of Sybase's Unix offerings and less than one-half that of comparable NetWare/Sybase SQL Server or NetWare/Oracle Corp. offerings. This means users currently employing NetWare or Unix to get more database power will have the option of using Windows NT at less cost without sacrificing performance.

In addition, Windows NT users that experience connectivity problems will have the luxury of dealing only with Microsoft. Windows NT has built-in networking services that support most common networking protocols and is designed to work with Windows- and DOS-based client workstations. Any problems will be Microsoft's to solve. This is far easier for users than trying to resolve connectivity problems that are the result of a mismatch between NetWare, Unix and Windows.

Windows NT also offers a more supportable platform. It has full memory protection; preemptive scheduling, which prioritizes and assigns resources to applications; and virtual paging, which extends memory onto disk. These features are available on more robust Unix and mainframe operating system platforms but are missing from NetWare 3.11 and 4.0. However, Novell has added some limited memory protection to NetWare 4.0, which is useful when testing applications.

SQL Server for NT differs from other SQL Server versions because it has been architected to support symmetric multiprocessing (SMP) hardware in native mode. This enables SQL Server to take advantage of multiple processors on a single machine. Since NetWare does not support SMP, no database server in a NetWare environment supports SMP systems. Nor is it likely that NetWare will ever be able to support SMP since it does not support preemptive scheduling, which is a prerequisite for scheduling tasks across multiple processors.

SQL Server NT supports integrated network and database server security administration, a graphical performance monitor and visual administration tools that can manage local and remote SQL Server database servers. Because Microsoft owns both the operating system and the database server, it has been able to achieve a level of integration currently not available on any other Intel Corp. or Unix platform.

Novell had hoped its partnership with Oracle to produce the OracleWare line of NetWare and UnixWare products (*NW*, June 21, page 19) would preempt Microsoft's Windows NT SQL Server announcement. However, Novell and Oracle have badly stumbled. There appears to be little interest in UnixWare, probably because Novell hasn't figured out how to market it. In order to properly position UnixWare — which has memory protection, preemptive scheduling and virtual paging — Novell must admit that NetWare is flawed, which it cannot do.

Since Novell cannot properly market UnixWare, it and Oracle have fallen back on trying to position OracleWare for NetWare as the true competitor to Windows NT — even with NetWare's architectural flaws. Microsoft hopes user organizations will reexamine their database server strategy and conclude that NetWare database servers, such as OracleWare, are too risky and limiting, and opt for NT's superior reliability, extensibility and performance.

Microsoft's main problem will be to support this new audience. The company's field personnel have very little experience in enterprise database development and are known for their arrogance and for recommending meager enterprise solutions simply because they carry the Microsoft label. These attitudes and approaches hurt Microsoft's credibility in developing enterprise solutions. Novell, on the other hand, has a very strong field organization with lots of experience and has successfully nurtured strong credibility within customer support organizations.

At this point, Windows NT and SQL Server for NT are brand-new products. As with all new software, I suspect that it will take a year or more for these products to stabilize. In the meantime, organizations will probably experiment with them and try to compare them to their current Unix and NetWare database server applications. My guess is that Windows NT will compare very favorably and will be gradually adopted as the platform of choice for a wide variety of client/server applications.

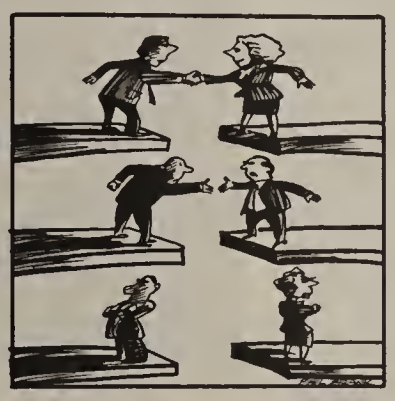
Finkelstein is president of Performance Computing, Inc., a consulting company in Chicago that focuses on client/server and rightsizing applications. He can be reached at (312) 549-8325 or via CompuServe at 72240,2536.

INTERNETWORKING

by Diana Larrea

Push vendors for interoperability

To date, network managers who build local-area network internetworks have had little choice but to lock themselves into one router vendor's proprietary solution. Router standards for interoperability are starting to change that, but progress is slow. It's time for network managers to start pushing vendors to ensure that their routers will interoperate in multivendor, multiprotocol internetworks.



Building multivendor, multiprotocol LAN internetworks requires router interoperability. Router standards are key to achieving this interoperability. During the past few years, several standards have emerged in the multiprotocol routing arena. Some of the more popular are the Point-to-Point Protocol (PPP) — which is a data link protocol — and routing protocols such as Routing Information Protocol, Open Shortest Path First and Integrated Intermediate System to Intermediate System.

But full router interoperability requires interoperability at multiple levels. Interoperability must be simultaneously achieved at the physical, data link and network/routing layers. The good news is that there are formal and robust standard protocols available at each level. The bad news is that, to date, most vendors' implementations of these standards is piecemeal.

Router vendors are rapidly implementing many of the networking standards mentioned above, offering these standard protocols on their older and their newer routing platforms — and that will help achieve interoperability in LAN internetworks.

But network managers must proceed with caution, remembering that interoperability is required at all levels. One standard implemented by two router vendors will not necessarily do the trick. Additionally, it is important to understand what functions a vendor supports over a given standard. For example, does the vendor support bridging *and* routing over the PPP data link?

Furthermore, full router interoperability will not be achieved through formal standards alone. Most LAN internetworks today run proprietary protocols at one or more of the layers mentioned previously. Examples of proprietary data link protocols include Network Systems Corp.'s Vitalink Control Protocol (VCP) and Digital Equipment Corp.'s Digital Data Communications Message Protocol (DDCMP); proprietary routing protocols include Cisco Systems, Inc.'s Interior Gateway Routing Protocol (IGRP), Apple Computer, Inc.'s AppleTalk and Novell, Inc.'s Internetwork Packet Exchange (IPX).

Interoperability will be required for these proprietary protocols, as well. Some corporations will require this interoperability only while they make the transition to an open, standards-based internetworking backbone. Other corporations will want to continue using these proprietary protocols indefinitely.

The task of achieving interoperability for proprietary protocols will depend on "how proprietary" the given protocol is. Some protocols can be classified as being "more open" because their specifications have been made public. This enables Vendor A to implement Vendor B's protocol on Vendor A's platform and, therefore, interoperate with Vendor B's routers. Examples of more open proprietary protocols are AppleTalk, DDCMP and IPX.

Specifications for other proprietary protocols, such as VCP and IGRP, have not been made public and are considered "more closed." Interoperability for these protocols will require individual implementation agreements between vendors.

For example, DEC has worked separate agreements with Cisco and Network Systems for interoperability with IGRP and VCP, respectively.

Once again, choice is in the air, but progress is slow. Network managers must escalate pressure on their current and prospective router vendors to ensure interoperability of all protocols. Those router vendors sincerely dedicated to offering users choice and investment protection in constructing and growing their LAN internetworks will implement the full portfolio of open standards and "more open" proprietary protocols. They will also work closely with other router vendors to ensure interoperability with their more closed proprietary protocols.

Larrea is a strategic planner for the Networks Engineering Organization at Digital Equipment Corp. She can be reached via the Internet at larrea@netwks.enet.dec.com.

Letters

On the right track

Regarding your editorial on the National Association of Communication Systems Engineer's (NACSE) certification program for network professionals (Sept. 27, page 41):

NACSE might be on the right track if they're trying to develop a true multitiered certification process. Their goal is a noble one, and I wish them the best.

It's interesting to see that there are so many product people in this industry saying you need this, that and the other type of certification. The ones that scream the loudest usually have a vested interest in pitching the "right" certificate to have. Has this industry become a cheap carnival with sideshow barkers trying to sell a bunch of hicks on the ultimate certificate? What color do you want yours to be?

Most individuals have limited funds and limited time to devote to legitimate continuing education. Which certificate or degree program do you bet on for future recognition and relevance? Which one will come and go as fast as CB radios and Nehru jackets?

Let's get focused in this area, maybe either by putting more emphasis on degree programs that are practical or doing what NACSE is proposing — developing a *real* certification process. However, the latter approach still has to be scrutinized in terms of who is developing the tests, what their real credentials are and so on.

When paper credentials and product-specific knowledge start to overshadow real and demonstrated abilities in broader areas, it's time to reengineer the hiring process.

James Carlini
President
Carlini & Associates, Inc.
Hinsdale, Ill.

Accessibility is key

In his column "The Internet: Why Now?" (Sept. 27, page 20), Scott Bradner professes amazement (and dismay?) that the Internet has suddenly entered into primetime. I'm amazed that the question has to be asked, since it has a fairly simple and obvious answer.

True, the Internet, in one form or another, has been "around and growing for more than a decade," but never before has it been so *accessible*. This is the key.

My first exposure to the Internet reminds me of my first microcomputer; I pretty much had to write a program to do anything on the computer. This was before fancy menuing systems and multifunctional applications.

Long before Gophers were tunneling, and before Veronica, Archie and Jughead were hanging out on the Internet, navigating the Internet meant sitting down with several three-ring binders and working out the mysteries of Telnet, File Transfer Protocol, Internet Protocol addresses and countless file formats. Menuing systems such as Hytelnet, Wide-Area Information Servers and Campuswide Information Systems were the stuff of dreams.

As reference librarians, my colleagues and I have been learning our way through the Internet for several years now. We see it as yet another source of information for library patrons. However, until quite recently, we have mostly acted as intermediaries between the information and the end user. Now, for the first time, applications such as Gopher allow the moderately computer-familiar to access the Internet with some hope of success. Though the Gopher and his friends are far from perfect, they are a giant first step. We now have some hope of teaching our students (and faculty) how to access the Internet on their own.

In the past couple of years, dozens of universities and university libraries have put their local horde of informational databases out on the Internet for all to access. Database treasures from the National Aeronautics and Space Administration, the National Institutes of Health, the National Science Foundation and so on are now more accessible by more people than ever before. While I might have been able to access some of these three or four years ago, I would have had to have been pretty familiar with the peculiarities of Unix if I had any hope of connecting.

Bradner says the Internet is appearing in cover stories and cartoons? Great! Let's see Vinton Cerf

See Letters, *page* 52

1993 ENNE Awards

Cabletron Systems, Inc.
Chase Manhattan Bank
Cisco Systems
Network General Corp.
Network World
NetWorld
Novell, Inc.
Texas Instruments
WilTel Data Network Services
WordPerfect Corporation
Vaughan/Caudle Associates

Network World and NetWorld congratulate the 1993 ENNE Award winners and scholarship recipients, and we gratefully acknowledge the support of the corporate sponsors.

Scholarship Recipients

Ball State University
Stevens Institute of Technology

Winners

ENTERPRISE INTEGRATOR AWARD

Enron Gas Services • Vaughan/Caudle Associates • Novell, Inc.

SINGLE-SITE USER AWARD

U.S. Air Force, District of Washington
Syntrex Technologies, Inc.

REGIONAL USER AWARD

City of Tulsa
3Com Corporation

NATIONAL USER AWARD

Sandia National Laboratories
Cisco Systems

GLOBAL USER AWARD

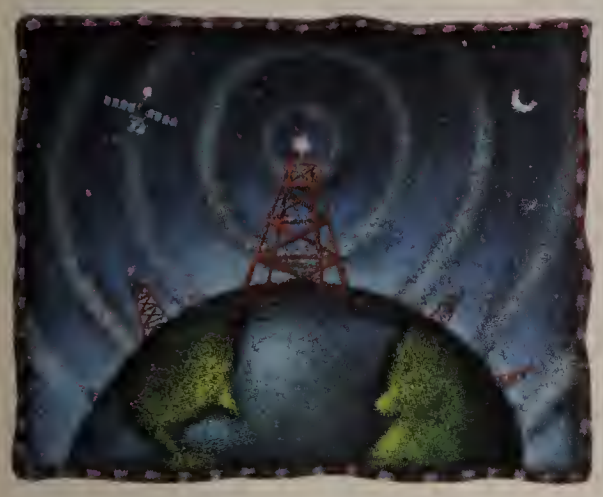
Chase Manhattan Bank
Novell, Inc.

TECHNOLOGY AWARD

Larscom
Mega-T™ Multiple T1 Inverse Multiplexer

WIRELESS DATA NETWORKING

Page 41



A few strings attached

The gamut of wireless data services gives users choice, but each has its strengths and weaknesses.

Page 45

Getting the message

Wireless messaging promises to usher in a new age of collaboration that will force net managers to explore novel ways of delivering data.

Anytime, anywhere. That's the promise from vendors hawking wireless data networking equipment and services.

Users implementing this nascent technology need to be wary of such claims.

Today, the reality is that net managers are faced with some real nightmares if they intend to provide a sufficient level of service and application access to mobile users in the field.

Likewise, the feasibility of replacing wire-based local-area nets with more flexible wireless technology is a choice driven by several factors — the most notable of which is the up-front costs.

But cost isn't the only obstacle, by far. The wireless LAN market is still quite fragmented, and no real leader has emerged among vendors. Motorola, Inc. has garned much fanfare for its Altair product, but the wireless LAN market is pretty much up for grabs. Few real standards exist, and vendors are still divided over which technology is best: radio frequency, infrared, microwave or other conventions.

Compounding matters, users may be in for a shock when they experience less than acceptable throughput levels.

The wide-area wireless data services side isn't much better. There, too, a lack of standards points up the novelty of the market. Some vendors, such as AT&T Paradyne, have proposed standards for wireless modems. But these proposals abound, and no clear winner appears ready to emerge from the battle.

More daunting yet, the Federal Communications Commission is riding herd over radio spectrum and is redefining use of the airwaves by wireless data services providers, as well as providers of such emerging technologies as personal communications services. Users need to keep an eye on FCC decisions that may affect the use of wireless products or services they employ.

Still, despite the obstacles, it's easy to understand all the interest in wireless data networking. Companies such as Federal Express Corp. and United Parcel Service, Inc. are improving service and using wireless technology as competitive measures.

Currently, estimates say 150,000 users tap wireless data services, and that is expected to explode to 5 million users by the end of the decade.

At this time, about 75 vendors operate in the wireless data industry, companies that specialize in equipment and services. And now systems vendors such as Apple Computer, Inc., LAN giants like Novell, Inc. and others are beginning to pitch their own plans for providing LAN services to mobile users.

Amidst all the product drivel, users need to sort though the marketing muck and establish their own mobile computing architectures. Forget about Apple's Client-Client/Server plan or any other fancy marketecture.

Users would be better off building their own vision for extending net services to local or mobile wireless users. And that vision starts with a set of needs that should be communicated to vendors. Until that happens, vendors will only be too glad to push their own products and options.

Remember, the market is just getting off the ground. Vendors are eager to make it work and recoup their investments. They need to listen to customers and address client needs.

Currently, there is no single solution that demands more attention than the others. Wireless messaging services — even one-way services such as Motorola's Embarc — may prove feasible for some applications. And certainly there are trade-offs between radio-based packet radio nets and emerging cellular-based data services. But those are tactical decisions that need to be made as part of a much broader mobile computing strategy.

That vision needs to come from within the company, and it needs to start with ends users, taking into account their needs and changing work patterns that may influence the net services offered to mobile workers.

In the end, only with a homegrown wireless data net strategy will net managers be able to offer the approporiate level of service their end users need without paying for unused capabilities.

By Charles Bruno
Features editor

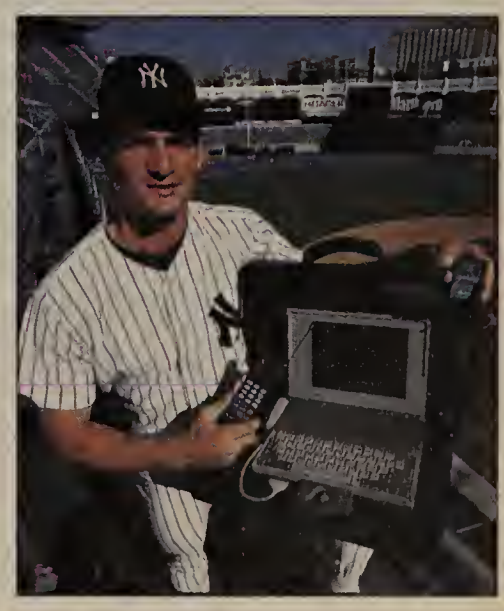
Page 47

No wires needed

Wireless LANs from Motorola and Windata face off in product evaluation.

ALSO INSIDE:

Page 43



The wireless Yankee

New York Yankee Pat Kelly turns to wireless communications for professional and personal business off the field.

Simplified Solutions For Complex Business Communications

When one source offers a complete list of business applications and services, even the most complex communications issues become simpler. Critical information reaches the right people at the right time. Speed, productivity, and customer service move from buzzwords to reality. Check it out in the press. Then call BT.™ Ask for our *Alliance* stories, customers' solutions simplified. 1-800-872-7654 (U.S.), or 1-800-874-7654 (Canada).

BT™

Going Further Staying Closer™

A few strings attached

BY ERIC JENSEN

The gamut of wireless data services gives users choice,

Doug Fields, vice president of telecommunications at United Parcel Service, Inc. (UPS), likes to point out that moving information while it is most valuable is a race against time.

And Fields should know. Early this year, UPS deployed one of the world's largest wireless data networks, called TotalTrack, to collect up-to-the-minute package information.

Each of UPS' 50,000 delivery vehicles are equipped with a Motorola, Inc. MC2 cellular modem. Everyday, the UPS fleet completes more than 525,000 cellular telephone calls, each lasting about 12 seconds, sending the latest delivery information back to a data processing center in Mahwah, N.J. With wireless data technology, UPS keeps constant track of the 1.3 million packages it handles daily. Fields says the network is "working very, very well."

UPS' use of wireless technology is a vivid example of how wireless data services can move information while it is valuable. Today, there are many types of wireless data technologies, from high-bandwidth local-area network systems that serve the office or campus environment to low-bandwidth low-earth orbit (LEO) satellites that can pick up data from the most remote parts of the planet.

The trick for any network manager is to understand how to best apply these emerging technologies to deliver the appropriate level of service to end users in the field. Perhaps the first issue users must learn to accept is that the technology can support data transmission speeds from about 1,200 bit/sec to over 14K bit/sec. The upshot is that while such services may support messaging-type applications well, net managers should not expect to rely on them for large file transfers or to support long interactive database sessions.

FIELDS

Still, end-to-end solutions can be bought from a wireless service provider or constructed locally with off-the-shelf cellular modems — all for a reasonable price. Applications that support current modem speeds can use wide-area wireless services today.

One of the benefits of emerging wireless technology is the breadth of choice they offer users. Packet-based radio services, one-way messaging and cellular-based data services just now making their way to market all offer net managers some interesting choices for supporting users on the move.

Then again, there's also another option to mull over: new wireless modems that employ sophisticated methods for transmitting data over cellular nets on a dial-up basis. Although choices abound, it pays to understand the nuances among the options since each bears its own benefits and potential drawbacks that need to be considered

Wireless service providers ARDIS Co. and RAM Mobile Data, Inc. have each built specialized packet-data networks. A packet network means that data is broadcast over a radio frequency in chunks, or packets, allowing the service provider to use its radio spectrum efficiently since the network is connectionless by nature. By contrast, in a circuit-switched network, like existing cellular phone systems, a connection reserves a certain amount of radio spectrum for the entire duration of the call, even if no one is talking or no data is being transferred.

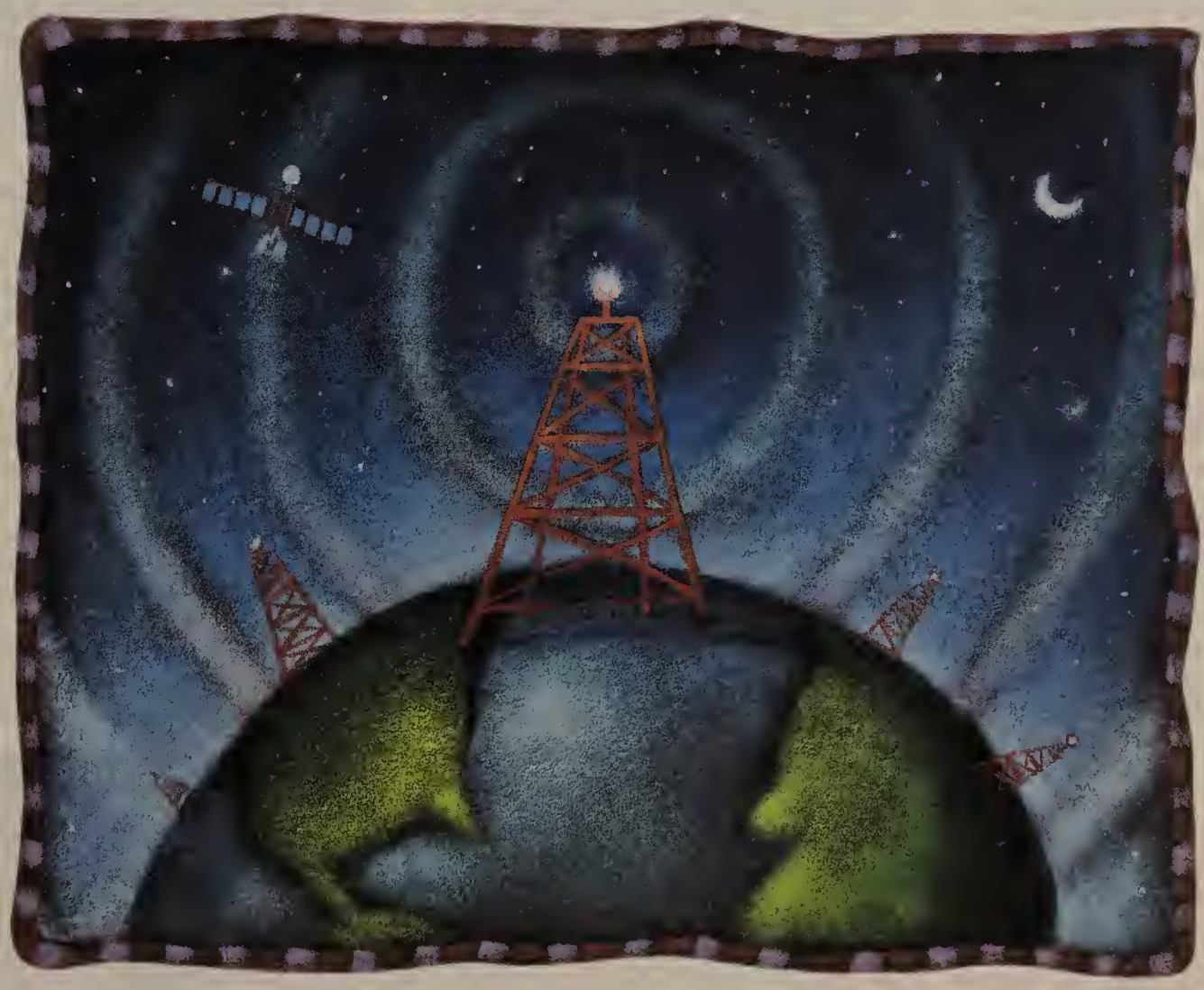
Mobile users send and receive data via packet radio modems attached to their computers. Such devices are about the same size as a hand-held cellular phone and are connected to computer serial ports. Packet radio modems have also been announced that will fit into a computer's PCMCIA slot if it is so equipped.

Mobile users can communicate with one another but will usually communicate with a server — such as an electronic mail or database server — at the home site that is attached to the service provider's packet network via an X.25 connection. In addition to X.25, ARDIS offers extensive support for connecting to IBM environments.

The packet radio modems for ARDIS and RAM Mobile Data networks are very different devices but, conceptually, they operate similarly.

There are two types of interfaces. The first, which is for programs, is a packet or message-style interface. The second type emulates a modem. The user issues AT-style commands to configure the device and establish the connection, but the connection must be to another packet radio modem or a server connected to the wireless service provider's network.

Continued on page 42



but each has its strengths and weaknesses.

Continued from page 41

It does not support links into the Public Switched Telephone Network.

Intel Corp.'s recently introduced Intel Wireless Modem for the RAM Mobile Data network is one modem that supports the AT command set. Motorola's InfoTac modem for the ARDIS network has both types of interfaces.

EULER

The packet interface is preferred for applications that can justify the additional development cost. This interface gives a user's program the most flexibility and control.

Packets can be sent to and received from many other packet radio modems without having to connect to them, and the program can get status information, such as radio signal strength, from the modem. The disadvantage is that the program has to be written to support the particular packet interface being used.

Many popular client/server communications programs have been written with the phone system or X.25 in mind and assume a connection-oriented environment. Provided the server has an X.25 interface, the idea behind the AT-style modem interface is to get these applications up and running without spending time to reprogram them. Changes to the client are limited to altering the modem setup and dialing scripts. For example, instead of dialing a phone number (for example, ATDT 1.212.123.4567), a packet data network address is dialed (for example, ATD 16000034).

Radio modems and their interfaces aside, another top concern for comparing packet radio services is the service provider's breadth of coverage. Both RAM Mobile Data and ARDIS have extensive coverage in the top Metropolitan Statistical Areas (MSA), a demographic designation used by the Federal Communications Commission when it first issued cellular radio licenses.

But venture outside the perimeter of these networks and users cannot connect to the packet radio service.

Consequently, net managers should pay attention if connectivity into the suburbs of major metropolitan areas is required; some communities may be well beyond the range of a provider's net. Because of the large investment required and the relatively small current customer base, RAM Mobile Data and ARDIS radio coverage outside of the top MSAs is limited or nonexistent.

A feature of RAM Mobile Data's network is nationwide seamless roaming. For example, a mobile user can travel from New York to Los Angeles and not have to change any settings or connect any differently with their packet radio modem; it is all transparent. According to Rob Euler, vice president of business development at ARDIS, the firm will offer roaming service by October.

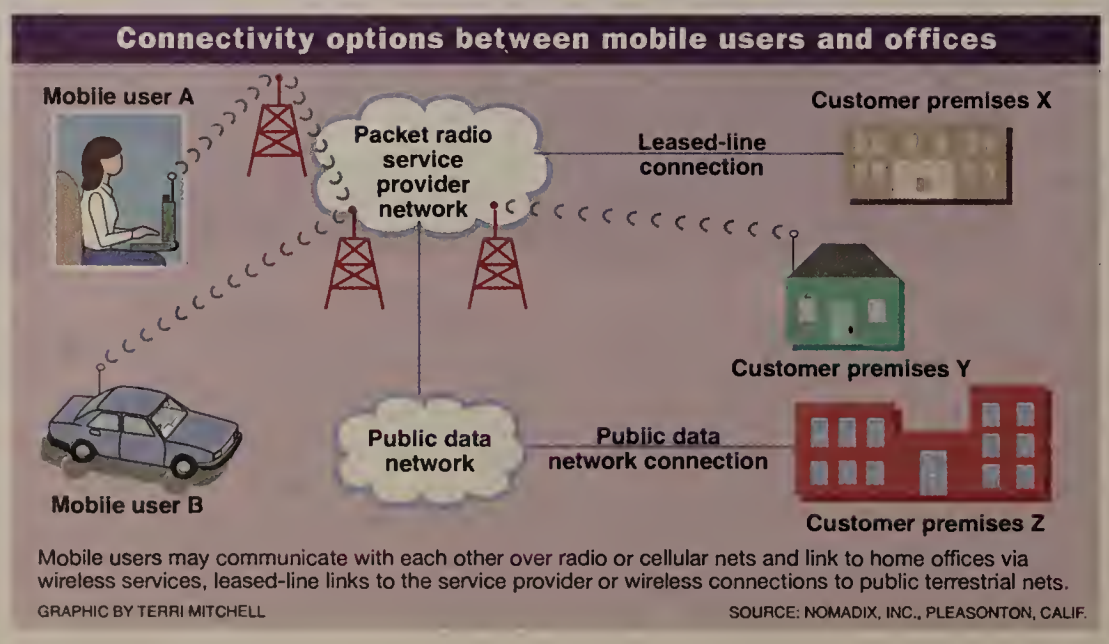
CDPD ARRIVES

Later next year, nine cellular operators plan to deploy wireless data services based on a technology called Cellular Digital Packet Data (CDPD). CDPD will coexist with the current cellular phone system and use the same cellular radio spectrum by dynamically finding and using the idle portions of bandwidth not used by cellular voice traffic.

The network interface to CDPD is Transmission Control Protocol/Internet Protocol, the standard protocol suite for internetworking. Each CDPD modem will have a unique IP address. IP packet and AT-style interfaces are defined. Using an AT interface, a user can Telnet — the Internet remote logon protocol — to another network host using a standard terminal program such as Procomm.

CDPD customers will be able to attach their corporate network to the CDPD operator's network. According to Bob Huntsberger and Russ Brankley, wireless data product managers at Bell Atlantic Mobile Systems, Inc., a subsidiary of Bell Atlantic Corp., customers will be able to connect to these services using a leased line, a public data network or possibly even the Internet.

Because CDPD uses the current cellular spectrum, CDPD operators are limited to providing service in their existing cellular markets. Roaming agreements between CDPD operators are required for nationwide coverage.



Radio spectrum usage

Usage of radio spectrum in the U.S. is governed by the Federal Communications Commission to maintain order on the air waves.

Service providers are allocated a fixed amount of radio spectrum with which to offer their services, and many are now struggling to make better use of the slice they have.

The amount of spectrum allocated to a specific service provider does not increase as the company's customer base grows, so the carrier is motivated to use its available spectrum as efficiently as possible to increase revenue. This setup has not changed with the FCC's recent allocation of spectrum for emerging personal communications services since the existing cellular carriers will have limited access to it.

The need for better spectrum usage efficiency is driving cellular operators to adopt digital cellular standards, such as IS54, which uses Time Division Multiple Access technology to improve bandwidth utilization.

Phil Karn, a staff engineer at QUALCOMM, Inc., sums up the bandwidth situation when he says, "Hardware is cheap, spectrum is expensive." QUALCOMM has developed a competing digital cellular phone technology based on Code Division Multiple Access (CDMA), which is also being evaluated by cellular operators. CDMA uses packets for cellular voice service.

Because it is digital- and packet-based, data transmission over CDMA is a natural service extension. Karn is busy integrating Transmission Control Protocol/Internet Protocol into QUALCOMM's implementation of CDMA.

BY ERIC JENSEN

The price of wireless freedom

Thinking about comparing wireless service providers simply on a cost basis? Better think again. Pricing for wireless data services is all over the lot, jeopardizing apples-to-apples rate comparisons.

Packet service providers typically charge per packet of data. In simple terms, the cost to send 1K-byte of data over a RAM Mobile Data, Inc. or ARDIS Co. net can run from 25 to 50 cents.

Another pricing strategy for packet services is to charge a flat rate for unlimited service. RAM Mobile Data has a limited flat rate offering. According to George Grabowich, director of marketing services at the company, customers that buy an Intel Corp. Wireless Modem will pay a flat service rate of $75 per month for their first four months of use.

Cellular phone companies charge users by the minute for connect time. A round number for this charge is 50 cents per minute. However, when comparing pricing, you have to account for the time it takes the cellular network to set up a call (about 15 to 20 seconds) and the time the cellular modems use to synchronize before they start sending data.

Users report that this synchronization time can be two to five seconds for V.22bis modems, eight to 12 seconds for AT&T's Enhanced Throughput Cellular technology (ETC) and more than 30 seconds for Microcom, Inc.'s MNP-10.

Regardless, cellular operators bill users for these call setup times. If an application sends or receives small amounts of data — a few hundred bytes or less — spread out over time, it can be cheaper to use a packet network. This decision is much easier for applications with a well defined amount and type of data.

If an application does more than send and receive short packets, it may be less costly to use a cellular modem. Such devices can transfer data at 50K bytes per minute (using AT&T's ETC technology) or more if standard data compression such as V.42bis is employed. At 50 cents per minute, a 1K-byte transmission costs about a penny.

Cellular Digital Packet Data (CDPD) service providers have yet to announce pricing, but indications show the service will be cheap. One insider who did not wish to be identified said that for decisions based on price, choosing CDPD service will be "a no-brainer."

BY ERIC JENSEN

Packet-based wireless data services quote burst speeds — the speed at which the data packet is sent. However, burst speed does not account for the idle time between sending packets, which depends largely on how the service is implemented and can have a dramatic effect when transferring data that is more than a few packets in size.

Burst speed does not account for the idle time between sending packets, which depends largely on how the service is implemented and can have a dramatic effect when transferring data that is more than a few packets in size.

For example, although RAM Mobile Data states a burst speed of 8K bit/sec, users observe closer to 1,200 bit/sec when transferring moderate-size E-mail messages or files. ARDIS' Euler indicates that his firm's network behaves similarly. Even though their services are not generally available, CDPD operators quote a burst speed of 19.2K bit/sec, but since CDPD is still being deployed, average speed, as observed by users, is still unknown.

The whole issue of whether transmission speed averages really matter is dependent on the applications that the service must support, according to Michael Merrill, president of Skyway Cellular, Inc., a cellular services and product retailer in San Jose, Calif., which is specializing in wireless data. For remote E-mail and other short-message applications — such as alarm messages, transactions and data collection — average speed probably doesn't matter. But if the user is expecting to move larger amounts of data in a short time, such as for file

transfers or remote LAN access, then using a cellular phone and a cellular-capable modem is the way to go.

USING CELLULAR

The cellular environment has a reputation for being nasty to data because of noise from interference and other radio and cellular system effects. Fortunately, there are modem protocols specifically designed for this kind of environment that give users a fast, reliable, error-free connection.

Perhaps the most common protocol used over cellular connections is Microcom, Inc.'s MNP-10 protocol. This protocol dynamically optimizes the speed and transmit levels of the cellular connection, plus it has an extensive error-correcting capability.

When ETC modems are used on both sides of the connection, stationary users will average 9.6K bit/sec and mobile users will average 7.2K bit/sec transmission rates. According to Scott, a rule of thumb is that an incompressible 100K-byte file can be transferred in just over two minutes of billable air time.

According to Greg Pearson, senior vice president of technology management at Microcom, MNP-10 is available in the vendor's modems as well as devices that use Rockwell chipset. In addition, AT&T Microelectronics has recently licensed the protocol for use in its own forthcoming chip. Such chipsets are the heart of MNP-10 wireless modems.

Protocols from other modem manufacturers are available or have been announced that are designed for the cellular environment, such as U.S. Robotics, Inc.'s High Speed Technology (HST) cellular protocol and ZyXEL's Cellular Option.

Motorola's MC2 modems, like those used by UPS, communicate with the cellular phone's radio to obtain information about the cellular environment, such as air link characteristics and when a handoff is about to occur. This information is used by the modem to "avoid errors before they happen," says Daniel Majhor, a support engineer with Motorola UDS. The modem also bypasses the voice parts of the cellular phone and accesses the cellular send and receive channels, directly increasing reliability.

Earlier this year, AT&T Paradyne announced the Enhanced Throughput Cellular (ETC) protocol, which is based on the V.32bis protocol common in high-speed modems. Unlike the MNP-10 or HST Cellular protocols, which require that both modems on a connection use the same protocol, ETC can work well over cellular connections with other non-ETC V.32bis modems, according to Bob Scott, manager of wireless data development at AT&T Paradyne.

When ETC modems are used on both sides of the connection, stationary users will average 9.6K bit/sec (not counting compression) and mobile users will average 7.2K bit/sec transmission rates. According to Scott, a rule of thumb is that an incompressible 100K-byte file can be transferred in just over two minutes of billable air time.

Another aspect of AT&T's PCMCIA-size ETC modems is Direct Connect. Most cellular phones require a separate unit to provide a standard RJ-11 phone plug for the modem to connect to the telephone. With Direct Connect, the ETC modem plugs directly into the phone, eliminating the RJ-11 phone adapter and giving the ETC modem direct access to the cellular send and receive channels. The ETC modem can also be used with regular phone lines.

WHERE TO?

The technologies for wide-area wireless are here, and they are accessible. AT-style interfaces for packet radio services let customers try the technology before they make a large investment. Likewise, cellular modems are relatively inexpensive (less than $1,000) and work reliably.

Large mission-critical applications, such as UPS' TotalTrack, can depend on wireless data technology. But so can users that just need to access an important file or send an important message while they are out of the office.

For people who need to move information while it's most valuable, wide-area wireless can do the job.

Jensen is a principal at Nomadix, Inc., a California firm specializing in mobile data networking and Internet services. He can be reached at (510) 443-0193 or via the Internet at ehj@psilink.com.

Wide-area wireless

A new source of wide-area wireless services called personal communications services (PCS) is making its way to market, albeit slowly.

The Federal Communications Commission has allocated spectrum in the 2-GHz frequency for use by PCS service providers. The FCC also set aside a spectrum slice for the operation of unlicensed devices such as wireless local-area networks and personal digital assistants.

As a future PCS service provider, MCI Communications Corp. has been promoting a PCS consortium as part of its strategy for integrated communications services. According to Steve Zecola, vice president of PCS, MCI has field-tested PCS service in Richardson, Texas, and Washington D.C. and is evaluating many technologies, including Time Division Multiple Access and Code Division Multiple Access.

Zecola says PCS and cellular phone technologies will converge over time. The difference will be in how the services are marketed. He sees PCS as a "low cost, mass-marketed service".

The unlicensed portion of the PCS spectrum is the focus of the Wireless Information Networks Forum, an alliance of more than 30 hardware and software vendors. WINForum is developing a set of rules to minimize interference and maximize fair access to this spectrum by unlicensed devices.

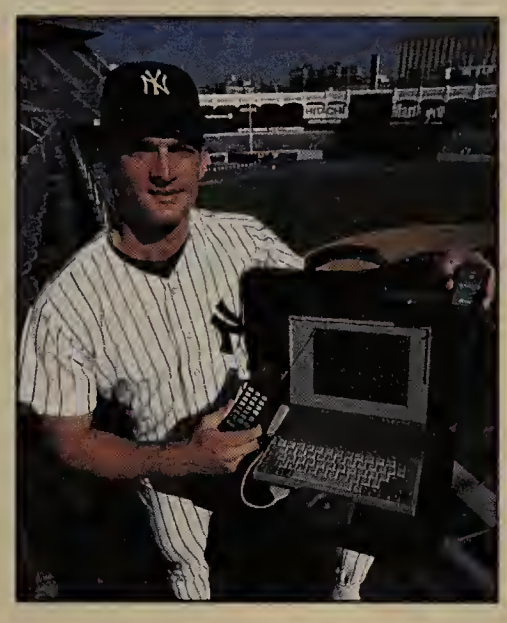
BY ERIC JENSEN

The wireless Yankee

Second baseman uses wireless to conduct business.

A glove and bat are the primary tools New York Yankee second baseman Pat Kelly uses to conduct business on the field. But when it comes to attending to professional and personal business off the field, Kelly turns to wireless communications.

The 25-year-old lugs an AT&T virtual office — a briefcase containing everything he needs to keep in touch with his agent, friends, family and fans — with him as he travels to American League cities.



Weighing 18 to 20 pounds, the virtual office is housed in a leather briefcase. It consists of an NCR Corp. Safari 3150 color notebook, AT&T cellular phone, AT&T Paradyne KeepInTouch data and fax modem operating at 14.4K bit/sec, rechargeable batteries with a four-hour life span, an AC power adapter and associated cables.

The KeepInTouch modem is a credit card-size PCMCIA card that plugs into the Safari notebook. Using the Enhanced Throughput Cellular protocol, the modem provides Kelly with cellular access to CompuServe, AT&T Mail and AT&T Easylink Services.

Kelly says wireless communications provides flexibility not available with traditional modem-equipped notebooks.

"It enables me to talk to my agent at anytime day or night," he says. "And I can do it wherever."

In fact, Kelly says he once retrieved an electronic mail message from his agent concerning a contract offer in the back of a cab going to Newark Airport. He promptly prepared and transmitted a response before reaching the terminal.

Being able to send facsimiles directly with his agent also makes communications more confidential by obviating the need to use the fax service at hotel front desks.

Such confidentiality keeps hotel personnel from seeing contract figures or delivering a fax with personal information to the wrong room.

Now eligible for salary arbitration, Kelly is bringing his virtual office with him on his off-season vacation to Australia and will keep in close touch with his agent during negotiations.

"Who knows," Kelly says. "I might be able to settle on a contract and avoid arbitration while I'm out at the Great Barrier Reef."

The virtual office will also help Kelly check up on his home and respond to fan mail.

"I can message my friend in Florida and ask him to check to see if anything is wrong with my condo while I'm away," he says. Kelly can also send E-mail to family members and use AT&T Mail's postal delivery option to transmit responses to fan mail.

Kelly also uses the virtual office as a competitive weapon. With access to CompuServe, he can tap sports-wire transmissions that show which players are going on the disabled list or which are being brought up from the minor league. Such information enables him to prepare for last-minute roster changes before a game.

During the course of games, Kelly takes handwritten notes on what pitchers throw him in certain circumstances and how opposing batters hit Yankee pitchers. He later stores the information in the notebook computer, so the next time he faces a pitcher, he checks the files to prepare himself. Likewise, Kelly checks on opposing hitters to determine how he should play them in the field.

Kelly is now about to test an online service that will enable him to download similar statistics about all players in the league. After downloading files, Kelly can find out how often a particular player hits to one field and position himself appropriately.

"The statistics show that [Detroit Tiger first baseman and home run hitter] Cecil Fielder will always try to pull the ball," according to Kelly. "So why should I play so far off the bag at second base when he is up? I'll play closer to the bag instead."

Because electronic devices are not allowed in the dugout during games, Kelly does his fact checking before games.

"It's something to use to get ready for a game," he says. "But once you get in there, your natural abilities have to take over."

BY JIM BROWN

Only Bell Atlantic offers three ways to shorten the distance between you and future ATM technology.

You might think that Asynchronous Transfer Mode (ATM) technology is too far off for your company to focus on today. But you can get many ATM-like high-speed, cost-saving benefits in your data communications *right now*—with Bell Atlantic* fast packet services. And because we're the only one in the region to offer you all three services, we can create a "hybrid" solution for your needs.

SMDS

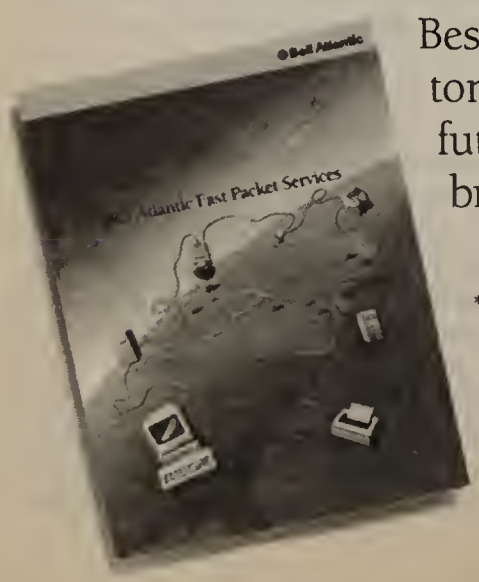
Switched Multimegabit Data Service extends the performance of LANs over a wide area with public, packet-switched, high-speed (1.17 to 34 Mbps) transmissions.

Frame Relay

A data communications service that provides high throughput and low delay for intra-enterprise, high-speed (yet bursty) applications.

FDDI Network Services

An all-fiber network that delivers a native LAN speed interface (4, 10 and 16 Mbps) to your LANs via a shared 100 Mbps FDDI backbone.



Best of all, these services are migratable to ATM, so you'll be better positioned for tomorrow. Look into how Bell Atlantic fast packet services can bring you closer to future ATM technology. Call **1 800 422-0455** today and ask for our fast packet brochure that details what each service can do for you.

*The Bell Atlantic family of companies includes the Bell Atlantic Systems Group, Bell of Pennsylvania, the C&P Telephone companies, Diamond State Telephone, New Jersey Bell and other communications and information management companies. Bell Atlantic fast packet services are not yet tariffed in New Jersey and West Virginia.

Call 1 800 422-0455

Bell Atlantic

Getting the message

Wireless messaging promises to usher in a new age of collaboration that will force net managers to explore novel ways of delivering data.

BY CHERYL CURRID

Wireless messaging communications usher in more than just interesting new technology — itis also setting the stage for users to pursue new and sometimes novel ways of working. Even though the technology is in its infancy and likely to mature into very different forms, users can find real value in today's products.

Early adopters of the technology have invented words like "cyber-think" and "tele-think," which represent a new form of interactive chatting from keyboard to keyboard. Another activity gaining popularity among the wireless crowd is accessing data services for updates on news, stocks, or sports and weather information. Some people are even experimenting with primitive forms of information agents and so-called software knowbots that automatically collect information on behalf of the user.

All of these new activities are fostering as many sociological changes as technical ones. Unsuspecting business users might be surprised at the freedom afforded by technology that they can carry. Moreover, people are likely to find themselves changing work habits, such as working from unconventional locations at unconventional times.

If early trends continue, wireless technologies could give much-needed support to such emerging organizational work styles as flat work teams, cross-functional and global work teams, and virtual corporations. Since wireless technology crosses time and location boundaries, it becomes unnecessary for members of a team to work in the same office building, city or time zone.

As companies alter the way they use data in the field, network managers need to be one step ahead, understanding these new work styles and adapting wireless technologies best suited to deliver the level of service end users need.

CYBER-THINKING

Some wireless messaging systems send and receive messages so fast that users can communicate with each other in a near real-time fashion. This lets people talk to or think with each other without actually being in the same location or near a telephone.

Users of RadioMail Corp.'s RadioMail, for example, the wireless E-mail service introduced last year, report that cyber-thinking can return a major unex-

Continued on page 46

Continued from page 45

pected benefit. Users are able to electronically pick each other's brains for quick conversations even though they may be on different sides of the country.

Since RadioMail is most often sold in a portable kit — vendors often sell it packaged with a radio modem and cables — it is easy for users to carry around their electronic ears and voices. A kit consisting of a small wireless radio modem connected to a Hewlett-Packard Co. palmtop computer and encased in a small Day-Timer style leather case turns into a welcome companion. Many users get into the habit of carrying it around with them and leaving the modem on all day. That makes them instantly accessible — as if someone had an exceptionally smart pager. This is even better because users can answer back as quickly as they receive messages.

Management consultant Jim Opfer, one of the country's heaviest users of wireless E-mail and one of the first to use RadioMail, puts it this way: "The power to connect and collaborate with high-powered brains in near-real time is awesome. It is like having an extra brain around with you to help solve a problem or solidify a thought."

Another use of wireless messaging technology lets news and events find people. In fact, since wireless messaging devices are so small and portable, late breaking news can be broadcast to people almost as quickly as it happens.

Today, there are several services springing up to keep users on top of industry, general news or sports events. Motorola, Inc.offers its Embarc messaging service, which can be set up to filter industry news, sports and weather for users to download each morning.

For those looking for more frequent updates, RadioMail offers an interesting service, called NewsFactory. Users can request headline news, news summaries or stock market averages at any hour of the day by simply sending a message to a special mailbox. The service returns a reply within 15 to 30 seconds — giving users a nearly instant update.

The hardest part of selecting such a service is understanding the trade-offs of functionality users give up by adopting one service over another. Motorola's Embarc, for instance, has a place in the business world, but it is a one-way transmission solution. If the application calls for a home office to download data to users in the field, Embarc will do the trick.

If users need two-way data transmission, such packages as RadioMail or Lotus Development Corp.'s cc:Mail running over packet radio nets such as Ardis or RAM Mobile's nets, will do. One caveat with cc:Mail is that it requires users to adopt radio modems that support the Hayes Microcomputer Products, Inc. AT Command Set. This setup works well for existing cc:Mail users because messaging operations don't change much. But users of other mail packages may find RadioMail more convenient because cc:Mail remote users must instruct the software to send and fetch messages; they don't arrive automatically.

Some users of wireless messaging systems have found ways to invent information agents or knowbots. They set up rules, filters, automatic retrieval systems and automatic message response systems. For the most part, these users aren't using exotic technology, but instead, clever ways of programming macros into palmtop computers.

Smarter technology is on the horizon. Programming rules and filters, like those pioneered by Beyond, Inc.'s popular BeyondMail electronic mail system, will soon be available for wireless messaging users. Moreover, users are creating automatic ways of pulling files and reports from corporate and public information systems. More extensive fetch and answer back capabilities will soon be a standard part of many software packages.

READY FOR PRIME TIME?

Today, many users of wireless messaging services are eager early adopters. They will put up with less than perfect platforms, cramped keyboards on palmtop computers, small storage capabilities for mailboxes, and a host of other slight warts. They make due with little inconveniences such as slow transmission rates and less than 100% coverage.

One analyst lives in an area where he is almost out of transmission range and cannot send or receive messages from his home. He's made a habit out of going outside certain hours of the night and propping his wireless E-mail on top of the hood of his car, where he gets better reception.

Marc Dodge, a technology manager at United Parcel Service of America, Inc., is testing wireless messaging with an eye toward deployment on a large-scale basis. Dodge is impressed but not rushing off to write purchase orders just yet.

For their trouble, however, the early adopters are getting to spend time living in the future. They are experimenting with technology that can profoundly change the information and communication equation. They are participants in what could be the next big paradigm shift for working — being able to work anytime, anyplace and from almost anywhere.

Currid is president of Houston-based Currid & Company, a technology analysis and consulting firm. You may reach her on the Internet at Currid@radiomail.net.

No wires needed

Wireless technologies from Motorola and Windata offer alternatives to traditional wireline LANs.

BY DANIEL BRIERE

Wireless local-area network products may be getting a bum rap, according to *Network World* Test Alliance member TeleChoice, Inc., which recently concluded an extensive evaluation of two products and found them well-suited for small work group and branch office operations.

As part of its ongoing evaluation of wireless network products, Montclair, N.J.-based TeleChoice installed Motorola, Inc.'s Altair II Plus and Windata, Inc.'s FreePort Wireless Ethernet LANs, and was surprised to find that the products performed far better and were more economical than had been anticipated.

That's not to say that each of the products operated without any kinks; testing did raise some issues with regard to throughput and possible interference from other radio-based office products.

THE WIRELESS LAN

The offices at TeleChoice represent a typical branch office environment, with 17 Macintosh and IBM-compatible computers and related devices linked to Ethernet and AppleTalk LAN segments. These segments are bridged by a Dayna Communications, Inc. Pathfinder bridge/router. Two 12-port Asante Technologies, Inc. 10THubs link the various devices.

Also attached to the LAN is a mail server running CE Software, Inc.'s QuickMail 2.60, as well as a LAN monitor and calendar server running AG Group, Inc.'s EtherPeek network analyzer and Now Software, Inc. Up-To-Date group scheduling system. Remote access to the LAN is governed by a Shiva Corp. LANRover/E outfitted with U.S. Robotics, Inc. Courier V.32bis and Zypcom, Inc. Z32t-SX modems. Eleven telephone lines are used for voice and data communications, with voice communications running through a six-line key telephone system.

TeleChoice selected the Altair system first for installation due to its compatibility with the company's current LAN layout. TeleChoice required a multivendor, multiprotocol wireless LAN. However, there are few solutions that are not tied to the IBM platform or specific network operating systems (NOS).

Altair is a wireless microwave product that operates in the 18-GHz spectrum and is licensed by the Federal Communications Commission. Motorola, which handles all of the licensing issues for the end user, has already been assigned the licenses by the FCC and allocates them to specific end users as systems are sold.

The system is transparent to the end-user NOS and provides 802.3 Ethernet connectivity. Users can run Novell, Inc. NetWare, Microsoft Corp. LAN Manager, Transmission Control Protocol/Internet Protocol, Banyan Systems, Inc. VINES and other protocols across Altair network.

The Altair system work group is a microcell comprising a Control Module (CM) and multiple User Modules (UM). The CM acts as the wireless LAN server for the system, while the UM transmits and receives end-user device information to and from the CM. Both the CM and UM are the same size — similar to a thick modem. Each UM can support as many as eight Ethernet devices over either 10Base2 (thin-net), 10Base5 (thick-net), or 10Base-T (twisted-pair) connections. Each CM will support as many as 50 users.

TeleChoice's office space is rather small — less than 3,000 square feet, which is easily within the coverage distance of the Altair CM (40-ft. radius/5,000 square feet in any walled area). In an open space, according to Motorola, the radius can extend to 130 feet. The building is also wireless-friendly; there are no steel frames, fire doors or metal piping to obscure the signals. Metal, concrete, marble and stone are among the obstacles that greatly attenuate wireless signals.

Only one CM and seven UMs were required to cover the Ethernet segment and the Dayna Pathfinder bridge to the AppleTalk LAN.

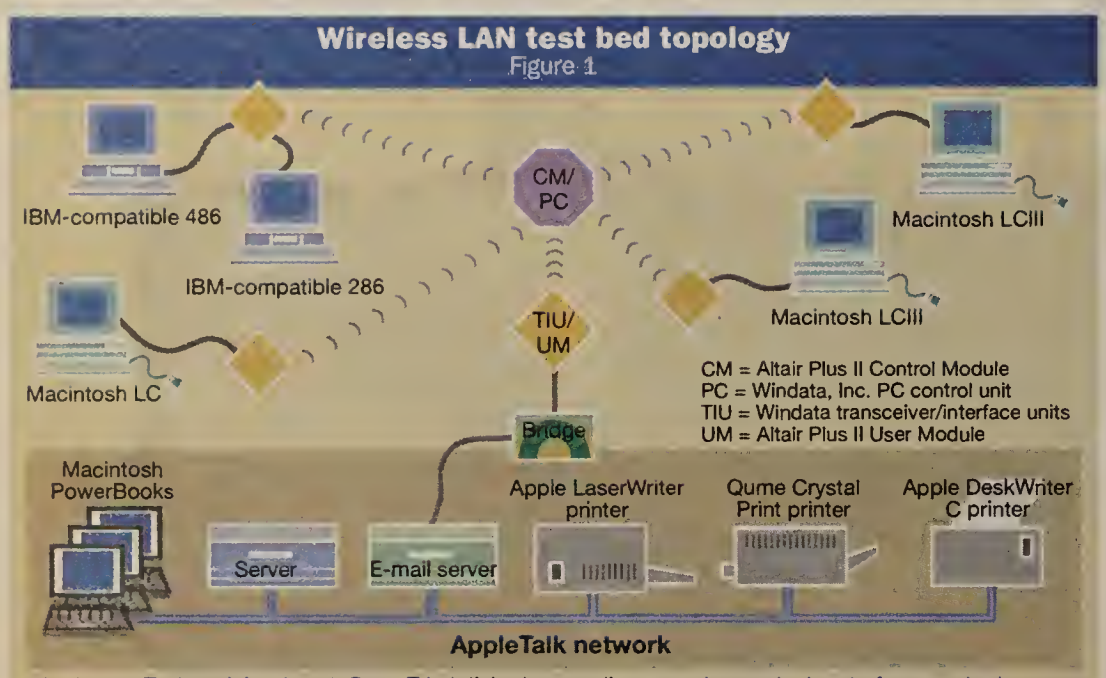
Installation of the system was incredibly easy. To install the CM, a user simply attaches it to an existing network or server via a 10Base-T or other connection and plugs in the power supply. Installing the UM is just as

Continued on page 48

Continued from page 47

simple: The CM and UM are self-learning devices. They detect user addresses from their own transmissions and automatically add these addresses to internal lists, which will provide filtering and forwarding capabilities to the network. Companies thinking about sending equipment from headquarters to remote sites will be impressed with the plug-and-play aspects of this system.

The great thing about the Motorola system is that no internal installation is required with the computers. A twisted-pair cable capped with RJ-45 connectors runs from the computer's Ethernet card directly into the serving Altair UM. This makes it easy for companies that are using wireless LANs as temporary solutions pending wire installation.



An Asante Techonolgies, Inc. 10Base-T hub linked to a radio transceiver at the heart of a star-wired topology communicates with wireless nodes in the wireless LAN evaluations. This topology paralleled TeleChoice's wired installation.

GRAPHIC BY SUSAN SLATER SOURCE: TELECHOICE, INC., VERONA, N.J.

The Altair system allows for remote monitoring and control of both wired and wireless networks from a single Simple Network Management Protocol work-station. This remote function is performed through a rather basic SNMP Management Information Base (MIB) II agent, along with a private extension. These MIB II agents allow a remote manager to change frequencies, configure devices and collect performance data using SNMP management systems.

The great thing about the Motorola system is that no internal installation is required with the computers.

WIRELESS PERFORMANCE

Performance of the system was more than acceptable for TeleChoice's applications, and problems were largely nonexistent. In tests, the Altair unit performed transparently to the user population, which was pushing predominantly word processing, graphics, statistical analysis and heavy printing chores over the network.

TeleChoice tested the integrity of both its wireline and wireless LANs with a Wandel & Goltermann Technologies, Inc. DA-30 protocol analyzer. The DA-30 also verified that Altair, indeed, 802.3 Ethernet-compatible and confirmed the network's health by testing for collisions and lost packets.

To measure throughput, AG Group's EtherPeek network analyzer was used to measure the wireless LAN's throughput as well as the throughput of the wireline LAN for a baseline reference. EtherPeek relies on the Ethernet interface to gather network traffic for troubleshooting and optimization.

Throughput was measured under different load scenarios. First, TeleChoice measured the actual traffic on the network. Next, to stress the network, simulated traffic loads were created by filling the network with dummy packets. EtherPeek measured all of these load scenarios so that TeleChoice could judge the wireless LAN's performance under present and potentially larger future network loads.

The firm's current network utilization is rather minimal given the network bandwidth. In its standard day-to-day operations, network utilization barely hit 5% on average, according to EtherPeek. TeleChoice's biggest network bandwidth hogs were network file transfers, printing and electronic mail.

To generate test traffic, we used Network General Corp.'s Sniffer analyzer. TeleChoice simulated Ethernet traffic by sending a series of 1,514-byte packets across the wireline and wireless networks. Under these loads, throughput over our wireline LAN conformed to expected Ethernet averages — hitting 9.847M bit/sec. The Altair system peaked at 6.18M bit/sec.

It is worth noting that the Altair system hit those high levels only in station-to-station tests. When Sniffer was set at broadcast mode to simulate broadcast packets in the network, Altair performance fell substantially.

The reason for the performance drop is that the Altair CMs and UMs are essentially Ethernet devices and, therefore, have to look at the broadcast packets to determine their destination. In a full broadcast mode, the Altair system barely hit 1M bit/sec. Depending on the level of broadcasting in a network, this could be an important issue. The average network traffic profile comprises between 2% and 15% of broadcast packets, depending on factors such as network topology and the operating system.

In all, Motorola has 600 licenses or 1,200 frequencies to cover metropolitan areas with populations of 30,000 or more.

The station-to-station throughput scores bested the 5.7M bit/sec rate claimed by Motorola. Motorola has been improving its product throughput levels over earlier implementations by refining its use of the spectrum and improving compression algorithms. These scores are considerably higher than the 3.3M bit/sec rate that Motorola claimed for earlier versions of the Altair system.

Performance is important, but it is not necessarily the most important issue surrounding LANs. As with any LAN — wireline or wireless — heavier traffic loads lead to increased network performance degradation. Another important aspect of wireless LANs is that they can be installed in locations that are not suitable to wired LANs, such as factory floors and old buildings.

The cost of the Motorola system is about three or four times higher than the cost of TeleChoice's wiring. A wiring contractor installed AppleTalk and Ethernet ports throughout the office and connected them to a wiring hub for a little more than $2,600, or about $153 per run for 17 devices. In major metropolitan areas, union fees can make that figure substantially higher.

The list price for an Altair system, on the other hand, is $4,995 for the CM and $1,195 for each 10Base-T UM or $1,295 for each 10Base2 or 10Base5 UM. There is no charge for the SNMP MIB. Altair comes standard with a new three-year return-to-factory warranty in the U.S.

TeleChoice's test configuration cost $13,360, but the UMs were probably overconfigured. A more cost-efficient way would have been to use multiport 10Base-T wiring hubs behind each UM. These hubs run between $200 and $400, depending on the vendor and the number of ports. This configuration would have provided a more wired solution than the firm's current totally wireless Ethernet solution, but all of TeleChoice's devices — including those now behind the Dayna bridge — would still have had access to the wireless option.

The cost of this configuration would have run around $10,375, or about $610 per connection. Also, discounting from distributors could have dropped the price to around $425 per connection, or roughly three times the wireline cost.

ISSUES WITH THE ALTAIR LAN

There were no performance issues that affected Altair's performance. This system was not affected by interference from other wireless devices, nor did it interfere with any other wireless products in the office. No failures or maintenance problems were recorded, either. In execution, the system was flawless. This is not to say, however, that there are no other issues that would influence the decision to purchase this wireless LAN system.

First, there is the licensing requirement to think about. Motorola took care of all TeleChoice's licensing, as it does with all other users. But in the event of an office move to a new town or state, Motorola may have to assign a new license. This issue is critical for companies thinking about using wireless for temporary installations, such as convention floor displays. Each license has two frequencies, and in any geographic area that has a radius of 17.5 miles, the maximum number of licenses is five.

In all, Motorola has 600 licenses or 1,200 frequencies to cover metropolitan areas with populations of 30,000 or more. If TeleChoice was to move into a major metropolitan area with its current Altair system, it may have to fight for spectrum.

Motorola acts as the frequency traffic cop in the U.S. by coordinating end-user installations so that far more than 10 systems can be installed within a 17.5-mile radius of one another. In fact, Motorola's Wireless Data Group has more than 200 CMs and UMs installed in its single-floor complex in Schaumburg, Ill. It is also worth noting that Altair is approved for operation in more than 20 countries.

The flip side of this issue is that Motorola has the advantage of having the 18-GHz range to itself in most areas. This means that users are protected from cochannel interference, which

Continued on page 50

Distinguishing among transceivers

One way to categorize wireless LAN offerings is to group them by topology. These products typically fall into one of three general topological categories.

■ External desktop transceivers, such as Motorola, Inc.'s Altair Plus II or Windata Corp.'s FreePort Wireless Ethernet, plug into a computer's internal Ethernet card and are transparent to the protocols being sent over the wireless Ethernet.

The products that use this approach tend to be larger and less portable than other solutions.

■ Internal desktop transceivers, which include TeleSystems' ARLAN, Proxim, Inc.'s RangeLAN2 and NCR Corp.'s WaveLAN, rely on their own conventional network interface cards inside personal computers. Excluding the actual location of the unit, the major difference between the internal and external transceivers is support for different computing platforms.

Most of these products are limited to IBM PC ATs or compatibles, where the external ones are usually equipment-blind. This is important, especially if you are planning to use the wireless LAN as an enterprisewide temporary transmission medium.

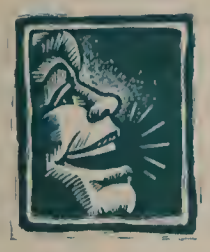
■ Portable transceivers for portable computing environments sometimes share some of the characteristics of the other two groups. In other cases, they are totally different.

The form factor for these is usually the PCMCIA standard. Companies such as Proxim have PCMCIA products that work with the desktop models.

Providing a wireless capability on a PCMCIA card is not easy. The software required to support roaming and remote authentication of users is expensive to develop.

Most companies are working toward having a full range of products in at least the desktop and portable computing environments, but many vendors are still in their first generation of products, so full-fledged product lines may be some time in coming.

BY DANIEL BRIERE

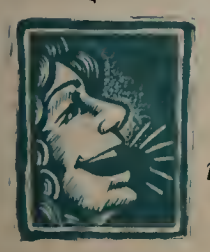


‘‘0 1 0 0 1 0 0 1 1 0 1’’

This is what your voice looks like when it is transmitted over a digital network. It is exactly what data looks like, too. Which is why it makes perfect sense that your best choice for a data company may very well be your phone company. In fact, GTE has been moving data and helping customers build complex networks for decades. We have a line on both the latest technologies and the best ways to maximize what you already have. So your company can make a smooth transition into the future. Whatever it looks like.

The Data Line 1-800-CALL-GTE

GTE



Continued from page 48

might be an issue in unlicensed areas of the spectrum.

The other thing is that by operating at 18 GHz, the Altair system is immune from machine-induced noise, which is commonly caused by the sparks produced by electric motors, arc welders and the starter circuitry in some fluorescent lights. In a wired LAN, particularly those using unshielded twisted-pair cabling, these sparks can induce voltage spikes, which interfere with transmissions over the unshielded twisted pair. These noises are typically below 2 GHz, though.

There is also the issue of security. Cellular callers learned early on that their signals could be tapped, so what about wireless LANs? The reality is that it would be extremely tough to tap into Altair's data stream and get anything useful. The Motorola unit itself can only transmit a short distance, so anyone attempting to break into the data stream would have to be in the immediate area.

However, users should note that the wireless signal is spherical in shape. When a UM was taken to the downstairs office of Hypotenuse, Inc., it still received the CM's signal.

But being in range to receive a signal is not enough. UM units have to be registered with the CM to receive signals, and a variety of scrambling and data frame formats make unauthorized interception and deciphering of calls difficult. When all of these variables — keys, polynomials and frame identifiers — are taken together, there is a one in 4.4 trillion chance that a single Altair data frame will be unscrambled.

Finally, there is the issue of distance. The Motorola unit has a rather limited transmission range of 130 feet. But Motorola has overcome this limitation by allowing multiple CMs to be linked on different noninterfering frequencies, allowing companies to add more users or extend coverage without decreasing performance.

A company can even increase performance by adding CMs within the footprint of another CM's microcell. One Motorola user achieved automatic redundancy in doing so — if one CM went down, the other automatically picked up the traffic since it was within the same area.

WIRELESS WITH WINDATA

TeleChoice also assessed the capabilities of another wireless LAN system — this one from Windata that offers levels of performance, cost, security and features similar to that of Motorola's Altair system.

The topology of the Windata system, FreePort closely matches that of the Altair system. There is a central hub and end-user transceiver/interface units (TIU). The signals in the central hub of the FreePort system are sent and received via a vertical tower antenna that resembles a two-by-four on its end. The central hub, itself, is a personal computer-size monitorless and keyboardless chassis.

Each TIU consists of a transceiver connected to an eight-port hub, giving each unit the capability of supporting as many as eight devices. The transceiver is about the size of a dictionary on its end. Like Altair, no internal cards from the wireless LAN are required — existing Ethernet cards are used — and connection to the device is via a twisted-pair RJ-45 jack to the TIU hub.

In total, the FreePort system can handle a maximum of 62 transceivers, each with eight ports. This capacity is well beyond that of the Altair system. Any of these transceiver ports could be connected to networks of their own, making the upper limit of devices supported by the FreePort system open-ended.

Popular applications for FreePort include linking LANs across a street, along corridors and across campus environments. FreePort is well suited to these implementations because of its design. In Ethernet terms, FreePort is a buffered repeater, which basically means that it passes on Ethernet addressing transparently. Thus, the system is free to support end devices, bridges, routers and backbones.

However, the FreePort system does not have a filter that would keep local LAN traffic from traveling to the other LANs. A bridge would have to be installed in front of the system for that application to occur.

In contrast, the Motorola system is based on a tree architecture. The CMs are connected to the UMs, which, in turn, are connected directly to end nodes. A backbone has to be wired to the CM. Also, there is an addressing limit — each UM is limited to eight devices hanging off its main port.

For wireless LAN-to-LAN interconnection, Motorola markets its VistaPoint wireless bridge. It operates in much the same manner as Altair except that it's designed for point-to-point links. It retails at $11,500 for a 500-foot version.

Performance with the FreePort system is quite good in interferencefree areas. A good rule of thumb: If it works on a wireline and the performance is adequate, then it will also work on a wireless LAN and the performance will still be adequate.

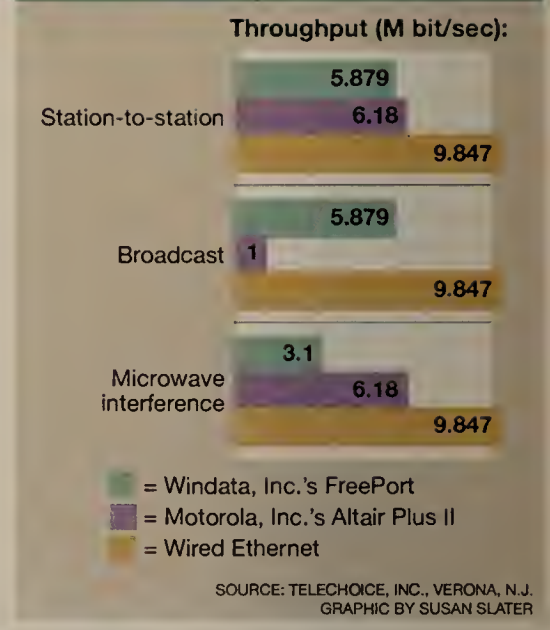
The Windata system operates in the unlicensed 2.440-GHz and 5.780-GHz range. It uses direct sequence spread-spectrum technology that is designed to avoid interference from other systems operating in the same frequencies. Devices that use spread-spectrum technology distribute portions of a signal across a broad range of frequencies in seemingly random patterns so that they appear as background noise to anyone trying to use to same frequency range.

Nevertheless, TeleChoice encountered interference from its wireless telephone system, Rose Communications' Premier wireless key set, which also operates in the 2.4-2.4835-GHz frequency band. Transmissions from the 2.44 GHz-based TIU to the 5.78 GHz-based hub caused signal loss and fading over the telephone handsets.

More importantly, the narrowband microwave signals from the phone system caused the Windata system to fall back to about 3M bit/sec throughput rates. According to Windata, that's what should happen — the system was designed to maintain the connection during any interference, shifting frequencies around the problem. All of this is probably more the fault of the telephone system than the Windata units, as the Premier phone sets do not use spread-spectrum technology to communicate with the host modules.

The FreePort system also saw interference from the microwave in the kitchen, which, when in operation, caused the system throughput to degrade. In all fairness, this would happen to anyone operating in the same frequency band. The important issue is that Windata can handle the interference, albeit at a somewhat lower performance level.

Wireless LAN throughput
Figure 2



SOURCE: TELECHOICE, INC., VERONA, N.J.
GRAPHIC BY SUSAN SLATER

In the test implementation, seven TIUs and a single hub were used to connect all of the devices on the Ethernet. In setup, the Windata system supplanted the Altair system entirely as the RJ-45 connections from the Altair UMs were switched to the FreePort TIUs.

FreePort's installation was almost as easy as Motorola's. Setup required entering addressing data into a Windows-based setup program, where the identification numbers of each of the transceivers and SNMP addresses resided. A disk containing this information was loaded into the central hub chassis, and the system was then up and running.

From a computer performance and throughput point of view, TeleChoice users perceived no difference among the wireline, Altair and Windata systems. This fact was not suprising, given the low network loads associated with the applications in use.

The firm again tested the wireless LAN with the Network General Sniffer analyzer. The Windata system peaked at 5.879M bit/sec before falling off. However, with either the Rose Communications phone system or kitchen microwave in action, the throughput dropped to 3.1M bit/sec. Note that these scores were achieved in full-broadcast mode, however. FreePort, unlike the Altair system, was not affected by broadcast packets because it behaves like a repeater, not an actual device on the Ethernet.

FREEPORT ISSUES

Aside from the problems with the phone sets, there were no major performance issues with the Windata system. Like Altair, it was largely plug-and-play and ideal for small office environments.

Windata has also tackled the security issues head-on. The FreePort system has three levels of security. First, there is the inherent security of spread-spectrum technology. Second, the FreePort system scrambles all data before sending it. And, finally, the required registration of the transceivers with hubs limits external access. In addition, there are end-user security efforts, such as password protection and encryption.

Mice that are nice

As a part of its investigation into wireless networks, TeleChoice, Inc. examined wireless mouses for Macintosh- and IBM-compatible systems and found it preferred radio as opposed to infrared technology.

TeleChoice examined the radio-based Logitech, Inc. Cordless MouseMan for the IBM-compatibles and the Z-NIX, Inc. Cordless Super Mouse for Macintoshes.

The Logitech mouses used radio frequencies between 100 KHz and 150 KHz to communicate with the receiver — a small cigarette-sized device that connects to the mouse port via a nine-pin serial interface. It is driven by a lithium battery. The receiver has a small LED that blinks as it senses signals from the mouse transmitter.

The mouse works up to six feet away from the computer. Setup is painless and, like any other automated mouse installation, the end user can set options, such as clicking speed and button assignments. No interference was detected during the testing, nor did it affect the operation of other wireless products in the office. One drawback, however, is that it's designed for right-handed people.

The Z-NIX Super Mouse operates using infrared technology. The infrared light-emitting diodes transmit mouse motion and button status via coded infrared light to the receiver.

The infrared receiver plugs into the Apple Computer, Inc. Desktop Bus port like any other mouse. The mouse is powered by a single rechargeable battery, and there is a charged backup battery in the base unit when needed. The receiver unit is also designed to store the mouse and recharge it between usage.

The day-to-day operational differences between the radio and infrared approaches were noticeable, with radio the preferred choice. The advantage of a wireless mouse is that it works well — even on the messiest of desks. The mouse can be tracked on most surfaces without the entanglements of the wire attachment.

In contrast, several testers reported that the Super Mouse's infrared receiver unit constantly required repositioning so the mouse could align properly with the receiver. This was never necessary with the Logitech mouse.

With a $149 list price — or a $99 street cost — the Logitech mouse is a no-brainer — everyone should have one. There are multiple frequency settings for the odd situation where interference occurs, although we operated two Logitech mouses side-by-side for six months with no problems. The disappointment is the lack of a Macintosh version.

For Macintosh users, the Z-NIX product was the only available option. Unfortunately, it is no longer available, leaving Macintosh users without a readily available wireless mouse option.

BY DANIEL BRIERE

When interference was encountered, it was difficult to nail down the culprit among all of the wireless technologies installed in the offices. Fortunately, Windata offers an SNMP interface, SeePort, that provides useful management capabilities. Using SeePort, TeleChoice discovered the source of the interference by monitoring, on a hub and transceiver level, the gain and interference loss while different parts of the FreePort system were shut down.

By isolating the network performance problems to a single Windata transceiver, it was possible to surmise that the telephone system, with its broadcasting antennae situated between the affected TIU and the main control hub, was the likely culprit. As part of this network diagnostic scan, Windata's engineers were able to dial in remotely to check on the network health via a modem connection into the control hub.

With regard to cost, the test configuration amounted to $19,875 at retail prices, although on-the-street discounting would probably drop that 20% to 30% to around $14,000. The hub retails at $7,450, and each TIU runs $1,775. The SNMP agent is included with the cost of the hub. However, the SNMP user interface, SeePort, costs an additional $2,300.

Excluding SeePort, the per-connection cost of the FreePort system is about $1,169 based on retail prices, and about $800 based on street prices. Unlike the Altair system, extra multiport wiring hubs are not required.

Still, the bottom-line price for the FreePort system for TeleChoice's application is 30% more than the Altair system. Larger implementations may be closer in pricing because of the smaller coverage area of each Altair CM. The Windata system has a one-year, return-to-factory warranty.

Some valid concerns about wireless LAN technology persist, particularly in the areas of performance and features. Both Motorola and Windata are working to improve their systems to address some of these concerns.

In many instances, wireless LANs have gotten a bad reputation. TeleChoice found that the wireless LANs performed well and were easy to set up. Would TeleChoice buy them? Yes, if the prices were in the range of $425 per connection. Why? Because TeleChoice's growth has led to three changes of location in five years. Each time, new wiring was installed. That money would have covered the cost of a wireless LAN system.

Still, some valid concerns about wireless LAN technology persist, particularly in the areas of performance and features. Both Motorola and Windata are working to improve their systems to address some of these concerns. Many sites have requested that Motorola and Windata allow for the inclusion of portable devices in this wireless scheme.

Both LANs tested are ideal for desktop or fixed-location environments and even for moving platform areas. However, they not for laptop computers or hand-held personal communicators. Motorola has announced PCMCIA products for the laptop environment, although a link to the Altair platform is currently not available.

Higher levels of throughput are being researched, too. At least one new vendor on the market — Calgary, Canada-based Wi-LAN, Inc. — is readying a product similar to the Altair and FreePort systems but promising signaling rates of up to 20M bit/sec.

The throughput burden should be placed on several shoulders, however. CPU speeds and software applications also affect overall throughput. Several end users have shared with us experiences of their wireless LANs in their labs, and the bottom line is that there are many applications that wireless can readily support but many they cannot.

Finding those applicable for your environment is a matter of testing. Vendors say they work with customers to demonstrate the technology and loan the equipment for testing. For TeleChoice's application and many branch office applications, wireless LANs should work perfectly.

So cost remains the only obstacle at this point. If wireless is viewed as a replacement for existing wireline, the cost will be a tough pill to swallow.

If, however, the installation is not so much keyed to cost as it is to trying to install a wireless LAN in an environment that is inhospitable to wireline LANs, wireless will be seen as quite reasonably priced. Factory floors, temporary networks, training facilities, connections across the street and, of course, branch offices are all good candidates for wireless LAN installations.

In the end, a wireless LAN simply adds flexibility to network design and should be evaluated as part of the overall approach to LAN networking.

Briere is president of TeleChoice, Inc., a Verona, N.J., consultancy specializing in strategic planning and analysis of intelligent networks, services and applications. He can be reached at (201) 239-0700 or on MCI Mail at DBRIERE (445-4690).

Network World Advertising
Colin Ungaro - President/Publisher
Thomas J. Wilson - Vice President, Advertising Director
161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 879-3167

Sales Offices

BOSTON
Donna Pomponi, District Manager
Eleni Brisbois, Sales Assistant
161 Worcester Road, Framingham, MA 01701
(508) 875-6400/FAX: (508) 651-1853

NEW YORK/N. NEW JERSEY
Carol Lasker, District Sales Manager
Tom Soevyn, Manager, Demographic Editions
Marlene Levis, Sales Assistant
365 W. Passaic St., Rochelle Park, NJ 07662
(201) 587-0090/FAX: (201) 712-9786

S. NEW JERSEY/PHILADELPHIA/D.C.
Jacqui DiBianca, District Manager
Patricia DiBiase, Sales Assistant
365 W. Passaic St., Rochelle Park, NJ 07662
(215) 834-1390/FAX: (201) 712-9786

CHICAGO
Dan Gentile, District Manager
Anna Gabriel, Sales Assistant
1011 E. Touhy Avenue, Suite 550
Des Plaines, IL 60018
(708) 297-8855/FAX: (708) 827-9159

SAN FRANCISCO
Lisa Hall, District Manager
Sandra Kupiec, District Manager
Paula Connor, Sales Representative
Beverly Davis, Sales Assistant
Brian Weiss, Sales Assistant
894 Ross Drive, Suite 200, Sunnyvale, CA 94086
(408) 541-8630/FAX: (408) 541-8640

Kim Schackel, CBC, National Acct. Mgr., Western Region
2443 Fillmore Street, Suite 427, San Francisco, CA 94115
(415) 928-3589/FAX: (415) 776-2475/Irvine: (714) 250-3006

ATLANTA
Don Seay, District Manager
Terry Sanders-Prentice, Sales Assistant
1400 Lake Hearn Dr., Suite 330, Atlanta, GA 30319
(404) 394-7509/FAX: (404) 255-5123

LOS ANGELES
Julie Haws, Sales Representative
18008 Sky Park Cir., Suite 145, Irvine, CA 92714
(714) 250-3006/FAX: (714) 250-4881

DIRECT RESPONSE ADVERTISING
Response Card Decks/ActionCenter/
Networking Marketplace
Joan Bayon Pinsky, Sales Director
Clare O'Brien, Senior Account Manager
Toni Clayton, Account Executive
Eleni Brisbois, Sales Assistant
(508) 875-6400/FAX: (508) 651-1853

RECRUITMENT ADVERTISING
Pam Valentinas, Senior Account Manager
Christie Sears, Operations Coordinator
(508) 875-6400

ADVERTISING OPERATIONS
Karen Wallace - Manager of Advertising Operations
Carla Blakely - Advertising Account Coordinator
Ann Lewis - Advertising Account Coordinator
(508) 875-6400

MARKETING
Evilee Thibeault - Vice President Marketing
Carol Leonard Fitzpatrick - Marketing Services Manager
Kristin Schiller - Marketing Specialist/Promotion

SPECIAL PROJECTS
William Reinstein, Director of New Business Devlp.
Debra Mahler, Product Specialist
Christie Sears, Operations Coordinator

RESEARCH
Ann MacKay - Research Director

CIRCULATION
Deborah Winders - Vice President Circulation
Richard Priante - Director of Circulation
Renee Visconti - Fulfillment Manager
Bobbie Cruse - Customer Service Rep.

PRODUCTION
Ann Finn - Production Director
Cathy McPherson - Production Coordinator
Terri Mitchell - Production Assistant
FAX: (508) 875-3090

REPRINTS
Donna Kirkey - Reprint Manager/Graphic Designer

LIST RENTAL SERVICES
Steve Tozeski - List Rental Sales
P.O. Box 9151, Framingham, MA 01701-9151
(508) 879-0700

NETWORK INFORMATION SERVICES
Jeff Pennett - Vice President Network Information Services
Jack McDonough - Network Manager
Anne Nickinello - Production Systems Manager

DISTRIBUTION
Bob Wescott - Distribution Manager
(508) 879-0700

IDG
Patrick J. McGovern - Board Chairman
Walter Boyd - President
William P. Murphy - Vice-President Finance

Network World is a publication of IDG, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. IDG publishes over 196 computer publications in more than 62 countries. Thirty million people read one or more IDG publications each month. Network World contributes to the IDG News Service offering the latest on domestic and international computer news.

Letters

Continued from page 37

on Letterman and Leno. I want Ed Krol plugging his book *The Whole Internet: User's Guide & Catalog* on Arsenio. How about *A Child's Guide to the Internet*? If the Internet is to evolve into something as ubiquitous as television, it has to become part of the common social experience. The techies and gurus have nurtured it this far; it's time for the coming-out party.

Steve Clancy
Reference librarian
Biomedical Library
University of California, Irvine
Internet: slclancy@uci.edu

No easy cure

I find your article about Novell, Inc. licensing UnixWare (*NW*, Sept. 27, page 1) to be somewhat naive. The assumption that if all the vendors license UnixWare instead of the core SVR4kernel, then all Unix systems will be compatible is just not valid. Doing so would mean that each of those systems would *lose* compatibility with their existing customer base, so it clearly won't happen.

And even if vendors were able to overcome compatibility issues, they would still have many differences in areas other than the scope of the UnixWare license. Even systems that currently claim to be binary-compatible — for example, UnixWare running The Santa Cruz Operation, Inc. or Sun Microsystems, Inc. Solaris binaries — are seldom able to run more than the most trivial cross-platform applications. There is no reason to believe that this would change.

Furthermore, you state that licensing UnixWare would result in more robust implementations of Unix. That implies that Novell's UnixWare, as currently shipping, is the most robust — and, presumably, reliable — version of Unix available. In fact, my experience has been that this is *very* far from the truth. The most reliable systems out there are the ones that have stuck with the same code base and gradually improved it over the years — switching to a new operating system and patching compatibility as well is a sure formula for disaster.

There is no simple panacea that will cure the ills of the Unix market, and the time to look for any real solution to the problem has long passed. As I've been wont to say, if Unix is the answer, then we've clearly forgotten the question.

Kee Hinckley
President
Utopia, Inc.
Arlington, Mass.

Sin of omission

Your recent article "CrossComm to integrate compression into routers" (Sept. 20, page 17) included a list of router vendors supporting data compression.

We'd like to point out that Retix, which was omitted from that list, has been providing data compression for its 4900 series bridge/routers since January 1992. Subsequently, in June of this year, Retix announced and shipped Release 2.0 of the RouterXchange 7000 family of products, which included data compression, among other new features.

Retix believes that data compression is an extremely important feature that allows customers to dramatically reduce the costs of their wide-area network links — an increasingly expensive part of running today's internetworks.

Since Retix was one of the first router vendors to provide data compression for high-end routers, we simply wanted to point out our omission from this list and make potential customers aware that we do provide this feature.

Randy Fardal
Associate vice president, marketing
for internetworking products
Retix
Santa Monica, Calif.

Help desk

Continued from page 2

You can also study for the CNA exam using Novell's student kit, which contains a set of manuals used to supplement Novell certification courses, as well as some of the NetWare systems administrator manuals. This kit costs approximately half the price of each Novell certification class. Check with any Novell Authorized Education Center for more information on the student kit.

I also recommend NetWare Supervisor's Guide *by John McCann as a good CNA reference guide. The book costs $33.*

We want to access the Internet from a remote AppleTalk network via our corporate Unix host using Quickmail, our electronic mail software. One way to do it might be to add an A/UX Macintosh to our network, and then establish a connection between us. Is Sendmail available on A/UX? Is there a Quickmail-to-Simple Mail Transfer Protocol (SMTP) gateway available that could connect Sendmail to our local-area network E-mail? Or do you have a better suggestion?
Sadhunathan Nadesan, San Diego

Joel Snyder, senior partner with Opus One, a Tucson, Ariz., consultancy specializing in networks and information technology, replies:

Adding the A/UX Macintosh to your network is an excellent and elegant approach. A/UX is a full-featured Unix implementation. If you're already familiar with Unix, A/UX should be an easy transition.

A/UX includes Sendmail, the mail transfer agent that comes with Unix implementations, as well as the software you'd need to make the link.

Quickmail-to-SMTP gateways are available from several different companies, including StarNine Technologies, Inc., InterCon Systems Corp., Worldtalk Corp. and Alisa Systems, Inc. For product information, call StarNine at (510) 649-4949; Intercon Systems at (703) 709-5500; Worldtalk at (408) 399-4000; and Alisa Systems at (818) 792-9474.

Once you've installed the Quickmail-to-SMTP gateway, A/UX isn't your only option.

For example, you might find a smaller version of your corporate Unix host easier to manage. Frankly, I don't envy the job of writing a Sendmail script.

Sendmail is one of the most arcane and difficult to configure parts of any Unix-based network. You could avoid Sendmail and get a more robust gateway by picking up a used OpenVMS system and adding Innosoft International, Inc.'s PMDF e-Mail Interconnect.

For product information, call Innosoft at (909) 621-5319.

If you insist on sticking with Sendmail, I'd suggest getting a copy of Craig Hunt's excellent book, TCP/IP Network Administration, *which may ease the configuration burden.*

For More Information About These Products:

Use this coupon or Reader Service prepaid post cards inserted in the October 4 and October 25 issues. Circle the Reader Service Numbers of the ads that are of interest to you and complete the name and address information and mail to:

Network World
P.O. Box 5090, Pittsfield, MA 01203-9828

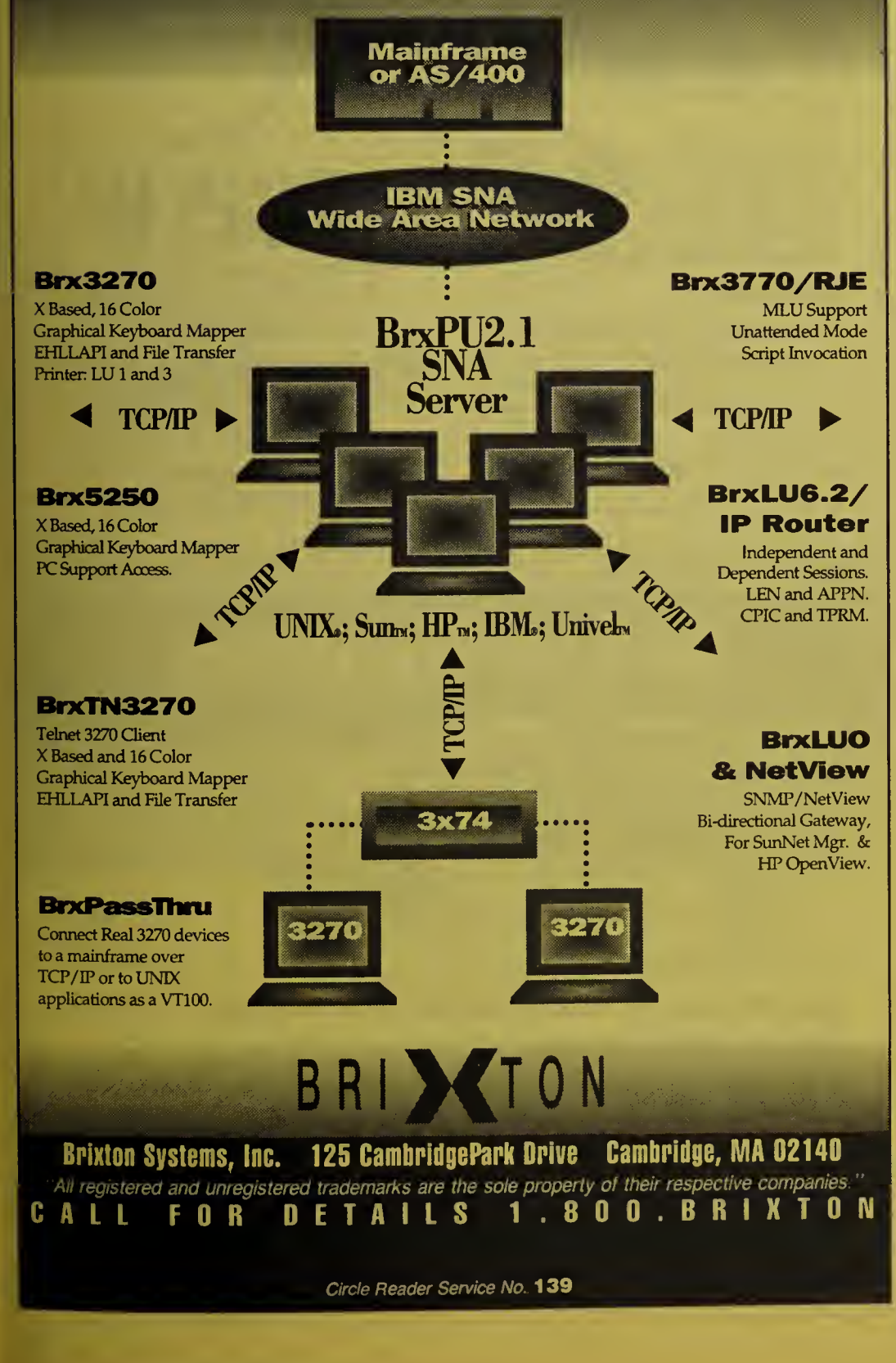
Expires 1/31/94

Name _____
Title _____
Company _____
Phone ( ) _____
Street _____
City _____
State _____ Zip _____
OCT

139	140	141	142	143	144	145	146	147	148
149	150	151	152	153	154	155	156	157	158
159	160	161	162	163	164	165	166	167	168
169	170	171	172	173	174	175	176	177	178
179	180	181	182	183	184	185	186	187	188
189	190	191	192	193	194	195	196	197	198
199	200	201	202	203	204	205	206		

CONNECTIVITY

SNA and UNIX
Cross-UNIX Platform, Integration Architecture.



Brx3270
X Based, 16 Color
Graphical Keyboard Mapper
EHLLAPI and File Transfer
Printer: LU 1 and 3

Brx3770/RJE
MLU Support
Unattended Mode
Script Invocation

Brx5250
X Based, 16 Color
Graphical Keyboard Mapper
PC Support Access.

BrxLU6.2/ IP Router
Independent and Dependent Sessions.
LEN and APPN.
CPIC and TPRM.

BrxTN3270
Telnet 3270 Client
X Based and 16 Color
Graphical Keyboard Mapper
EHLLAPI and File Transfer

BrxLUO & NetView
SNMP/NetView
Bi-directional Gateway,
For SunNet Mgr. & HP OpenView.

BrxPassThru
Connect Real 3270 devices to a mainframe over TCP/IP or to UNIX applications as a VT100.

BRIXTON

Brixton Systems, Inc. 125 CambridgePark Drive Cambridge, MA 02140

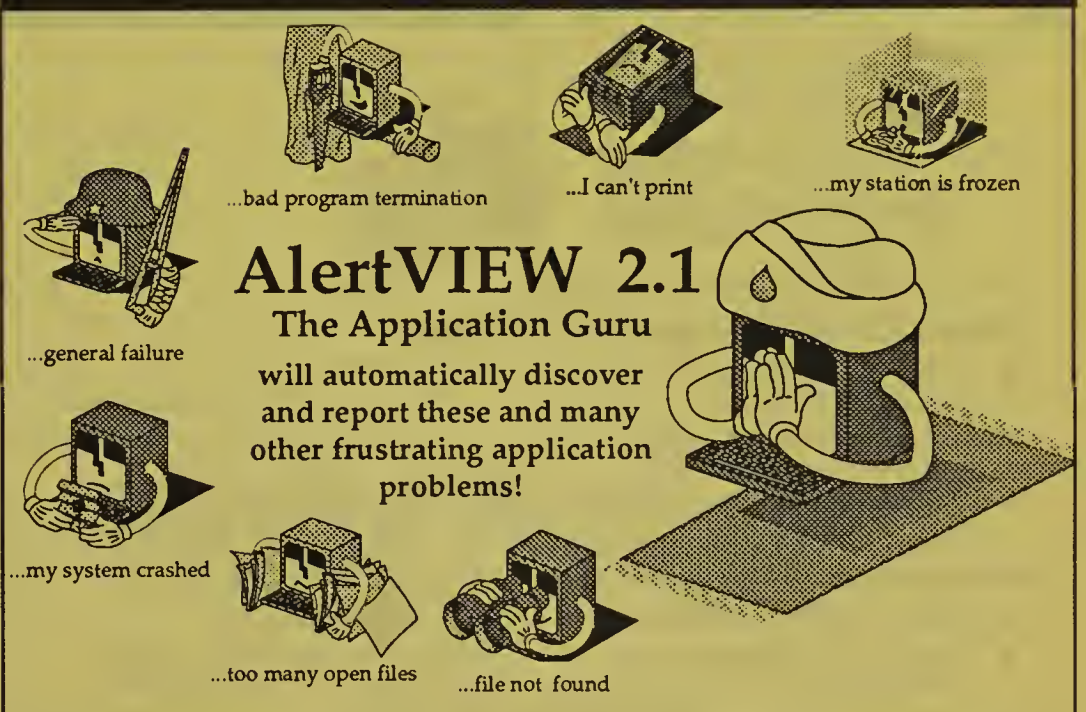
"All registered and unregistered trademarks are the sole property of their respective companies."

CALL FOR DETAILS 1.800.BRIXTON

Circle Reader Service No. **139**

LAN APPLICATIONS MONITORING

Application Monitoring *for* Windows, DOS, and OS/2



AlertVIEW 2.1
The Application Guru

will automatically discover and report these and many other frustrating application problems!

- Detect and report DOS, Windows, and OS/2 application problems ("I can't print", "I can't start Windows", "My machine is frozen", etc...)
- Correction procedure-- Automatically correct application problems ("unattended management console")
- Scheduled procedures-- Automatically perform housekeeping tasks (execute scheduled backup, reindexing, gateway control, etc...)
- Support for NetWare 3.11/4.0, LAN Manager, LAN Server, and other NetBIOS LANs
- Automatically forwards network alerts to remote locations via modem or cc:Mail
- Free!!! Remote Access and Inventory Software

Call (415) 694-7410 Now for a FREE DEMO

Interactive Product Demos On Network World's Bulletin Board
Dial (508) 620-1160 (300 to 2400 bps 8/N/1); (508) 620-1178 (9600 bps)
NetACCESS

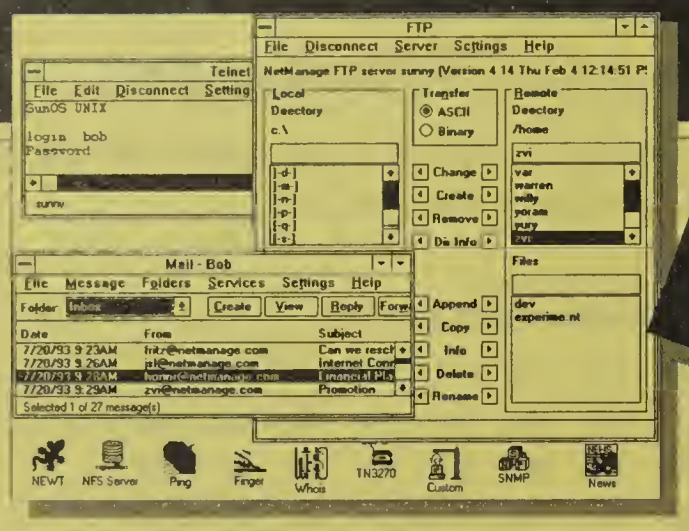
Data Comm MAGAZINE HOT PRODUCTS 1993 AWARD

SHANY

1101 San Antonio Road • Mountain View, CA 94043 U.S.A.
Telephone: (415) 694-7410 • Fax: (415) 694-4728

Circle Reader Service No. **140**

TCP/IP for Windows



CHAMELEON™ 100% DLL NFS ■ RPC SNMP

- All applications are both client and server
- Works concurrently with NetWare, LAN Manager, Vines, etc.
- Up to 128 simultaneous sessions

NEW! NFS Client & Server

Applications:

TELNET (VT100, VT220), TN3270, FTP, TFTP, SMTP/Mail, News Reader, POP, SNMP, Ping, Bind, Finger, Whois, Statistics, and Custom

Developer Tools:

- Windows Sockets API
- Berkeley 4.3 Socket API
- ONC RPC/XDR
- WinSNMP API

BUYERS ASSURANCE SEAL — May 1993

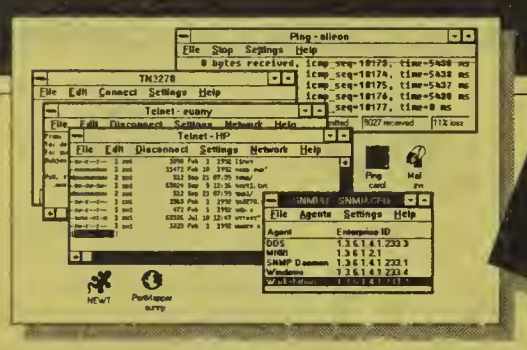
Requires only 6KB of base memory
Implemented as 100% DLL (not a TSR)

For overnight delivery call:

NETMANAGE™
(408) 973-7171
NetManage, Inc.
20823 Stevens Creek Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle Reader Service No. **141**

SNMP for Windows



CHAMELEON™ 100% DLL NFS ■ RPC SNMP

BUYERS ASSURANCE SEAL — May 1993

Extensible SNMP agent for Windows

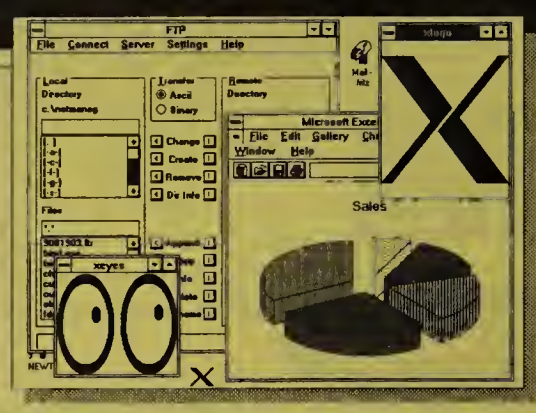
- Includes MIBII, Workstation, Windows and DOS agents
- Dynamic registration of multiple agents, managers, and proxies
- ***WinSNMP API*** developers kit available
- Compatible with any SNMP manager
- Implemented as 100% DLL
- Requires only 6KB of base memory
- ***Free*** with NEWT, Chameleon, and Chameleon*NFS*

For overnight delivery call:

NETMANAGE™
(408) 973-7171
NetManage, Inc.
20823 Stevens Creek Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle Reader Service No. **142**

X for Windows



2 for the price of 1
X and TCP/IP
Optimized Pair

Highlights:

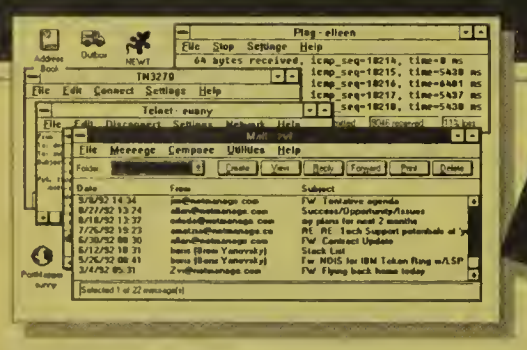
- Takes only 10 minutes to install both X and TCP/IP
- Implemented as a 100% DLL (not a TSR)
- Requires only 6KB of base memory
- XRemote, super fast dial-up option

For overnight delivery call:

NETMANAGE™
(408) 973-7171
NetManage, Inc.
20823 Stevens Creek Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle Reader Service No. **144**

SMTP Mail for Windows



CHAMELEON™ 100% DLL NFS ■ RPC SNMP

BUYERS ASSURANCE SEAL — May 1993

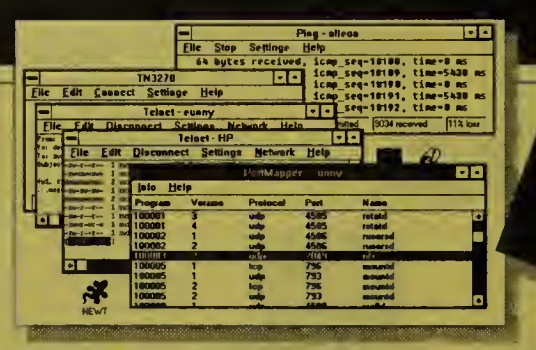
- Direct access to SMTP/Unix mail from Windows
- POP2 server included
- LAN and serial link to the Internet
- Address book with groups (mailing lists)
- Multiple message viewing
- Point-and-click operation
- Implemented as 100% DLL
- Requires only 6KB of base memory
- ***FREE*** with Newt, Chameleon, and Chameleon*NFS*

For overnight delivery call:

NETMANAGE™
(408) 973-7171
NetManage, Inc.
20823 Stevens Creek Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle Reader Service No. **143**

NFS for Windows



CHAMELEONNFS™ 100% DLL NFS ■ RPC SNMP

BUYERS ASSURANCE SEAL — May 1993

First and only NFS client and server for Windows
First and only print client and server for Windows

- Network drives are mounted from within Windows
- Network printing in the background
- Up to 24 network drives
- Implemented as 100% DLL
- Requires only 6KB of base memory
- Included in Chameleon*NFS*

For overnight delivery call:

NETMANAGE™
(408) 973-7171
NetManage, Inc.
20823 Stevens Creek Blvd., Cupertino,
CA 95014 USA Fax (408) 257-6405

Circle Reader Service No. **145**

CONNECTIVITY SOFTWARE

Connect to Everything.

Enterprise networking has never been this simple.

WinNET *plus*™ removes the barriers between networks so you can access printers and files anywhere on your network. ***Wherever they are.***

ONLY **WinNET *plus*** allows Windows to see multiple networks simultaneously. **WinNET *plus*** is also completely integrated with the Windows desktop, including *File Manager* and *Print Manager*. Now you don't have to be an expert to network across platforms.

Imagine the possibilities!

Banyan VINES® · Novell NetWare®
Windows™ for Workgroups
Apple Macintosh® · LAN Manager™
DEC PATHWORKS for DOS™
TCP/IP · NFS · *and more*

Connect your enterprise for only $149.

1-800-426-4368

BANYAN · MICROSOFT WINDOWS COMPATIBLE · yes

cogent

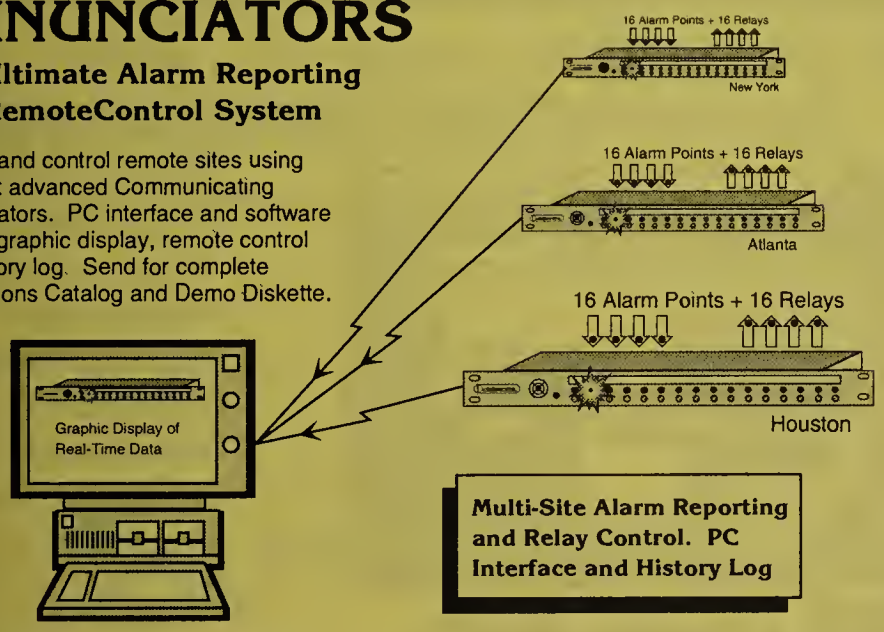
Circle Reader Service No. **146**

ALARM REPORTING

COMMUNICATING ANNUNCIATORS

The Ultimate Alarm Reporting and RemoteControl System

Monitor and control remote sites using the most advanced Communicating Annunciators. PC interface and software provide graphic display, remote control and history log. Send for complete Applications Catalog and Demo Diskette.



Multi-Site Alarm Reporting and Relay Control. PC Interface and History Log

dataprobe

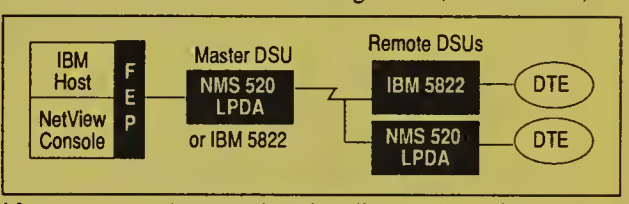
170 Coolidge Avenue, Englewood, NJ
Phone: 201-569-6464 Fax: 201-894-0939

Circle Reader Service No. **147**

IBM COMPATIBLE DSU

THE NMS 520/LPDA BEATS THE IBM 5822.

Only GDC offers a software-programmable DSU that's completely compatible with the IBM 5822 — and offers additional features at a lower price. The most advanced DSU on the market, our new NMS 520 Diagnostic Data Service Unit has a unique LPDA-2 option to make it line-compatible with IBM's 5822 series DSUs. This option also makes it compatible with IBM's NetView network management. Other features include support for more extensive centralized control of configuration, surveillance, and comprehensive diagnostic testing, plus line measurement capabilities. For more information, call +1-203-792-0542. In North America, call toll free 1-800-777-4005.



General DataComm

WORLD CLASS *inter* NETWORKING

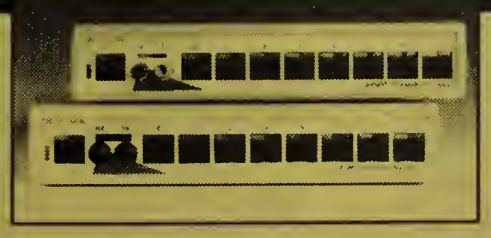
World Headquarters 1-203-574-1118 Hong Kong 852-526-5511 Canada 1-416-498-5100 Australia 61-2-956-5099
United Kingdom 44-734-774868 Europe, Africa, Middle East Headquarters 33-1-48133470 Japan 81-3-3862-1730
GDC and General DataComm are trademarks of General DataComm Industries, Inc. NetView is a trademark of IBM Corporation

Circle Reader Service No. **149**

AS/400 CONNECTIVITY

AS/400 8 PORT UTP MULTIPLEXERS

The world's smallest full-featured mux saves on costly cable runs.



- Supports 8 ports over fiber and/or UTP link, hot back-up capability.
- Extends maximum link distance to 10,000 feet.
- Complete bi-directional reconstruction of data signal.
- Optional unit with DB25 connector for easy attachment to controller.
- Most cost-efficient solution utilizing all categories of UTP wiring.

Call today for our free catalog:

1-800-966-4444 Ext. C1

Full Line of AS/400 Connectivity Products

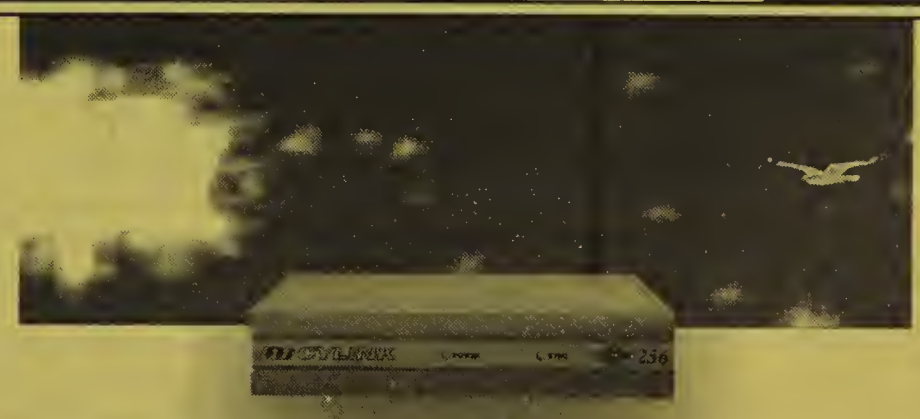
GALCOM INC.

Special VAR & Distributor Pricing Available

211 Perry Parkway, #4, Gaithersburg, MD 20877

Circle Reader Service No. **148**

INSTANT WIRELESS COMMUNICATIONS



Instant Wireless Communications

Set up economical network links with AirLink wireless digital modems, within or between buildings, up to 30 miles away, in minutes. Just plug in your voice, computer, LAN, or videoconferencing equipment, set a few switches and you're ready to fly. Airlink modems come in various speeds: 64, 128, 256 kilobits/second, and fractional T1. No license, no red tape, no carriers, no wires. Contact: Cylink Corporation, 310 North Mary Avenue, Sunnyvale, California, USA, 94086. Toll-free (USA): 800-533-3958, FAX: 408-720-8294, Telephone: 408-735-5800. Worldwide sales & support.

AIRLINK

England: Cylink, Ltd., Hampshire—TEL: +44 256 468186 • FAX: +44 256 24156
Singapore: Cylink Corporation—TEL: +65 336 8577 • FAX: +65 334 1429

CYLINK

Circle Reader Service No. **150**

REMOTE ACCESS SOLUTIONS

ATTENTION DISTRIBUTORS AND RESELLERS

THE INTELLIGENT CHANNEL BANK FROM N.E.T. HAS JUST GOTTEN A LOT SMARTER

Now, you can offer your customers the most efficient, economical channel bank solution. The New N.E.T. ADNX/48 with the Integral LAN Exchange(ILX) is the only channel bank with Integral LAN Bridge and SNMP. It's an economical, single product platform that integrates LAN, voice, non-LAN data and video traffic onto onc T1/FT facility. And it's from N.E.T. A world leader of enterprise networking solutions from access products to TDM's to cell relay.

BE SMART, CALL N.E.T. FOR THE ADNX/48 ILX AND SOLVE YOUR CUSTOMERS' REMOTE ACCESS SOLUTIONS INTELLIGENTLY. 1-800-388-4NET

NETWORK EQUIPMENT TECHNOLOGIES

Circle Reader Service No. **151**

LOCAL NETWORKS

UPGRADE YOUR NETWORK

Let LANFIX Save You $ by Supplying your NEW & Buying your OLD

ETHERNET		Token Ring		Specials	
3C509 TP	145.00	IBM 16/4AT	390.00	SMC PS 110	95.00
3C523MCA	130.00	IBM 16/4 MCA	325.00	TC 6042/6142	40.00
NOV NE2000	90.00	IBM 8228 MAU	275.00	WD8003 E	60.00
WD 8013	110.00	Madge 4 MEG TR	95.00	3C501	50.00
3C505 B	150.00	Proteon MAU	175.00	IBM 4 MEG TR-1	50.00

We Specialize In...

3 Cam • IBM • Interlan • Navell • Protean Standard Micro Systems (SMC) • Western Digital • Pure Data • Gateway • Thamas Conrad • Intel • Synoptics • Madge Tiara • Exas & Others

We Repair:

Component (Chip) Level Repair of Local Area Network Products by qualified trained technicians.

Novell Certified NetWare Engineer — Trained and tested to provide superior NetWare Support.

LANFIX inc SINCE 1985

Call for Information Pack

1-800-448-7420

FAX: 801-226-7895 • 1378 West Center Street • Orem, UT 84057

Circle Reader Service No. **152**

NETWORK MANAGEMENT

SNMP Management

Packed with features, and only $495, SNMPc™ is the smart choice for Windows™ Network Management.

- Hierarchical Maps
- Node Discovery
- Generic Hub Display
- MIB Compiler
- MIB Table View/Edit
- Event Action Filters
- Remote Alarms
- DDE/API Interface
- Supports any TCP/IP

30 Day Guarantee, 1 Year Free Update, and much more...

Castle Rock Computing

20863 Stevens Creek Blvd. Suite 530 Cupertino, CA 95014

1-800-331-SNMP

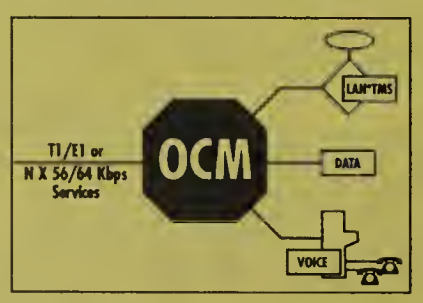
Fax 408-252-2379

Circle Reader Service No. **154**

MULTI-MEDIA INTERNETWORKING

EXTEND YOUR BACKBONE TO THE BRANCH OFFICE.

Link remote branch offices into your corporate network via "groomed" N X 64 Kbps digital services with GDC's powerful new Office Communications Manager (OCM). The OCM*TMS accommodates multiple applications — data, voice, video, LAN, and fax — over cost effective transmission facilities such as FT-1/FE-1 and generic digital services.



The OCM*TMS enables you to combine many remote locations onto a single T1/E1 facility terminating at a backbone node. To protect your investment, the OCM*TMS software-based technology offers downloadable upgrades for your future needs. Call +1-203-792-0542. In North America, call toll-free **1-800-777-4005**.

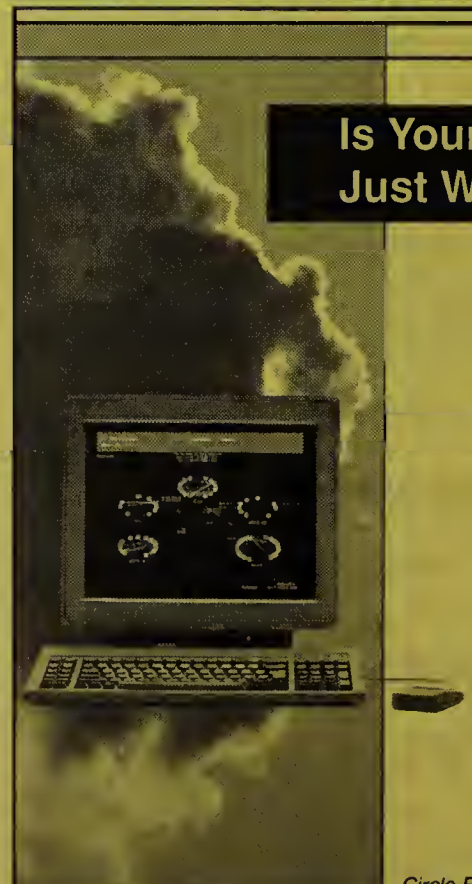
General DataComm

WORLD CLASS *inter* NETWORKING

World Headquarters 1-203-574-1118 Hong Kong 852-526-5511 Canada 1-416-498-5100 Australia 61-2-956-5099
United Kingdom 44-734-774868 Europe, Africa, Middle East Headquarters 33-1-48133470 Japan 81-3-3862-1730

Circle Reader Service No. **153**

NETWORK MONITORING AND ANALYSIS



HP NetMetrix

Is Your Network Just Weathering the Storm?

You can ride it out, or ...

Break through the clouds with HP NetMetrix monitoring and analysis applications. You need powerful applications to provide clear end-to-end visibility of your internetwork.

HP NetMetrix includes an Internetwork Monitor, Load Monitor, Protocol Analyzer, Traffic Generator, and NFS Monitor.

The software runs on a standard UNIX platform, and supports Ethernet, Token Ring, or FDDI networks. HP NetMetrix is based on standards (SNMP, RMON, X, etc.) making it a natural fit in your management environment.

Call or fax for a free demo, and break through the clouds on your network.

HEWLETT PACKARD

One Tara Boulevard
Nashua, NH 03062
1.603.888.7000 • 1.603.891.2796 (fax)

Data Comm HOT PRODUCTS

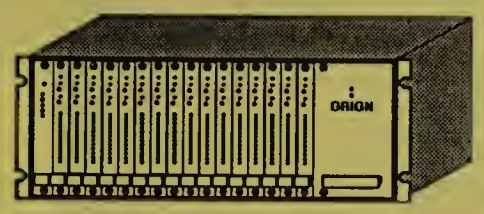
Circle Reader Service No. **155**

SNA DIAL-UP NETWORK

AN ADVANCED *HIGH-SPEED*

SNMP DIAL-UP NETWORK

Finally, an MIS expert can use a single mouse to control thousands of dial-up devices (e.g. modems, CSU/DSU, and etc.) through SNMP. Galaxy Networks is proudly presenting a complete dial-up network solution with an easy-to-use SNMP network manager based on MS Windows. Configuring & monitoring the network, implementing the diagnostic test & security control, and reporting alarms, statistics & events are as easy as "clicking". Protect your investment for the future by setting up a standard dial-up network today. CALL NOW!!!



GALAXY NETWORKS, INC.
A Global Networking Company

Tel: (818) 998-7851
Fax: (818) 998-1758

9348 De Soto Ave., Chatsworth, CA. 91311

Circle Reader Service No. **156**

VIDEO CONFERENCING

Video Conferencing Across Windows LANs and WANs!

Connects you and co-workers across buildings, campuses, and the world.

InVision™ is the premiere video conferencing solution for your PC!

- Full-motion, real-time, color video and audio conferencing between your Windows PCs
- Works on any network you have — Ethernet, Token Ring, FDDI, Frame Relay, ATM, ISDN, etc.
- Requires no extra wiring or network connections
- Allows you to use all your third-party Windows applications during video conferences
- Allows access to all network resources during your video conference — servers, printers, e-mail, etc.
- Interoperates with your network operating system — Netware, Lan Manager, Lantastic, Vines, etc.

Seeing Is Believing. Video conferencing means faster and better decisions, more accurate information, and greatly increased productivity! And, InVision's new technology makes video conferencing a practical reality TODAY for all your LANs and WANs. To learn more about the ways InVision can benefit your organization, or to order InVision immediately, please call:

(703) 506-0094 • Internet: info@invision.com

InVision Systems Corporation

8500 Leesburg Pike, Suite 300 • Vienna, Virginia 22182 • CompuServe: 72002,1677 • Fax: (703) 506-0098

Circle Reader Service No. **159**

Call Today. A Complete InVision Kit Is Available For Your PC.

SYSTEMS INTEGRATOR

Network Integration

VOICE • VIDEO • DATA

FOCS designs, furnishes, installs and maintains—on a nationwide basis—the cable and wiring systems and physical layer interfaces for premises/campus information distribution. For complete solutions, contact FOCS, 50 D'Angelo Drive, Marlborough, MA 01752 or **CALL 800-989-FOCS.**

FOCS, Inc.

A Woodhead Industries, Inc. Subsidiary

Circle Reader Service No. **157**

VOICE/DATA/FAX MULTIPLEXER

New Generation Voice/Fax/Data Multiplexer saves Thousands of Dollars—Month after Month

By Paul Longoria

SAN ANTONIO, Texas — If you can say YES to the next two questions then you may be in for a pleasant surprise!

1. Do you have remote computer users that need access to your LAN, mini, or mainframe?
2. Do you have any long-distance phone or FAX charges between your branch offices?

Be A Budget Hero!

Now, thanks to a revolutionary new generation of multiplexers, you can save up to $6,000 per user per year in operating and line costs AND save up to an additional $24,000 per year in long-distance charges for each phone line you replace!

Save money three ways. How?

By combining voice, FAX and data over one or more low-cost digital lines you can:

1. Call long distance and FAX for FREE
2. Eliminate unnecessary modems and equipment expenses
3. Eliminate redundant, monthly phone line charges

Powerful, New Technology

DATA RACE, the industry's price/performance leader, is now introducing its newest generation of high performance Voice/FAX/Data Multiplexers. From 8 to 64 ports, the new MACH DS plus multiplexers include these important features:

1. 8Kbps Single or Dual Channel Free Speech™ Voice/Fax
2. FlashLoader™ for quick and easy upgrades
3. Multiple 64Kbps Composite Links
4. Sync/Async Selectable User Ports
5. Exclusive VariLink™, Any Card, Any Slot Chassis System
6. Pays for itself in months—not years!

FREE Cost-Savings Guide to Voice/FAX/Data Networking

For a limited time, DATA RACE is offering a FREE *Cost-Savings Guide to Voice/FAX/Data Networking*. This 12-page guide will help you calculate how much money you can save for Data-only or Voice/FAX/Data networks. Call 1-800 329-7223 for immediate information. Or write or FAX DATA RACE 11550 IH 10 West, San Antonio, Texas 78230, FAX (210) 558-1929.

Circle Reader Service No. **160**

DATA RACE, 11550 IH 10 West, San Antonio, Texas 78230

TCP/IP NETWORKING

The First Suite of Windows Connectivity Applications That Will Work Over Any Desktop TCP/IP!

New Release!

AIR SERIES™ 2.0

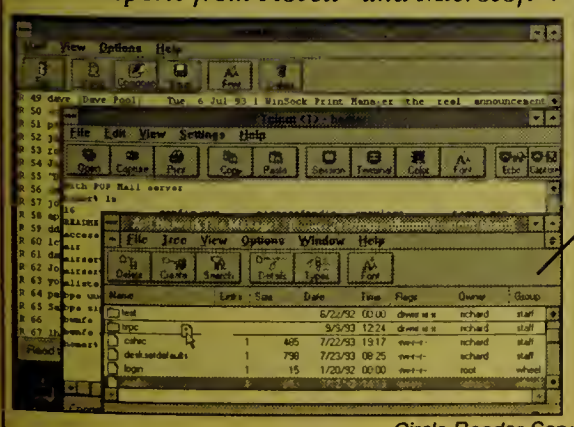
Microsoft Windows Compatible

yes It runs with NetWare

Applications are available separately to run with your TCP/IP or can be purchased with industry standard transports from Novell® and Microsoft®.

Applications

NFS • Telnet • tn3270 • FTP/RCP Server
X-Server • WinSock • DNS • SNMP
Network File Manager™ (ftp) • LPR
RPC for WinSock • NetBIOS • AIR Mail™
AIR News™ • AIR Gopher™



The First ftp Integrated Into Windows File Manager!

Call Today! (206) 447-0300

SPRY™
NETWORKING THE DESKTOP

316 Occidental Avenue South Seattle, WA 98104
Fax: 206-447-9008 • Internet: Info@spry.com

Circle Reader Service No. **158**

VOICE/DATA MULTIPLEXERS

PRICE BREAKTHROUGH!

Subrate Voice/Data Integration at Half the Price

TELEMAX

DAWN 2200

$ 2,495 Complete!

2 High Quality Compressed Voice Channels (FXS/FXO/PLAR including ring generator, or E&M)

2 RS232 Sync or Async Data Channels (2.4, 4.8, 9.6, or one at 19.2 Kbps)

Call us for a voice demo, and the name of your local distributor

Telemax Corp. 1989 University Lane, Ste. I / Lisle, IL 60532
Phone (708) 241-0909 / Fax (708) 241-0943

Circle Reader Service No. **161**

MARKETPLACE
The Hub of the Network Buy

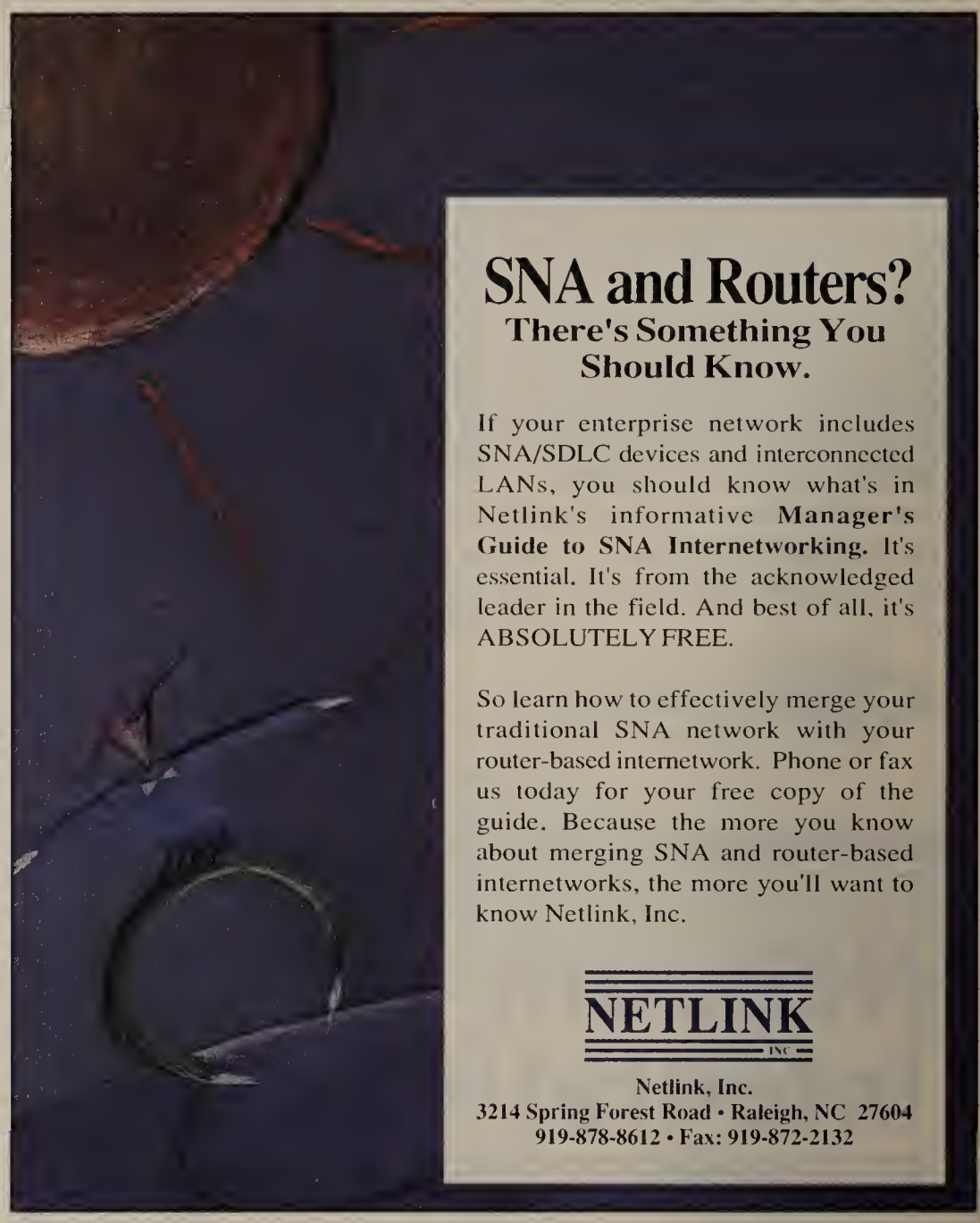
Fast Info with FaxNET

Here's how it works:

- Dial **1-800-664-8271** on your touch tone phone.
- Wait for the prompt and follow instructions.
- Key in advertisers' 5 Digit Number.
- Information requested will be faxed to you immediately.

MORNING STAR TECHNOLOGIES ...30070
NETLINK 30010

There is no cost to you to receive information on these network products and services!



SNA and Routers?
There's Something You Should Know.

If your enterprise network includes SNA/SDLC devices and interconnected LANs, you should know what's in Netlink's informative **Manager's Guide to SNA Internetworking.** It's essential. It's from the acknowledged leader in the field. And best of all, it's ABSOLUTELY FREE.

So learn how to effectively merge your traditional SNA network with your router-based internetwork. Phone or fax us today for your free copy of the guide. Because the more you know about merging SNA and router-based internetworks, the more you'll want to know Netlink, Inc.

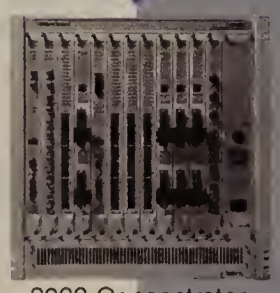
NETLINK INC

Netlink, Inc.
3214 Spring Forest Road • Raleigh, NC 27604
919-878-8612 • Fax: 919-872-2132

Need SynOptics Fast ?

Call ENS!
800-756-4NET

Free Video
"The Complete SynOptics Solution"



3000 Concentrator

SynOptics

ENS
Enterprise Networking Systems, Inc.
Leading the Way in Internetworking Systems & Support

- Great Prices on Entire SynOptics Line
- Same Day Shipment
- Express Replacements
- Internetworking Hotline

IBM DCA

BUY * SELL * TRADE

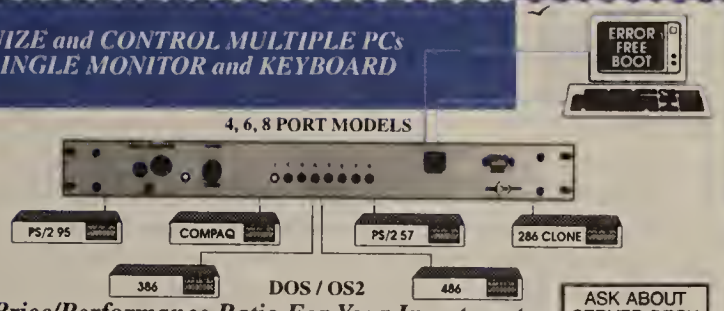
NEED TO BUY
IBM CAU'S, LAMS, SDLC Cards
MC-Store Loop Adapter, Any Quantity!

IBM 4MB TOKEN RING	49.00
IBM 4MB TOKEN RING MC	99.00
IBM 16/4 TOKEN RING MC	299.00
IBM 16/4 TOKEN RING AT	399.00
IBM 5250 EMULATION AT/MC	249.00
IBM 3270 EMULATION AT/MC	99.00
IBM 8228 MAU	225.00
IBM 8218 COPPER REPEATER	275.00
IBM 8220 FIBER OPTIC CVT'R	875.00
DCA IRMA I BLOWOUT	**49.00**
DCA IRMA III	199.00
DCA IRMATRAC 16/4	299.00
MADGE TOKEN RING 4MB	**69.00**

Piedmont Data Systems
Atlanta,Georgia
Phone (404)449-3425 Fax (404)441-1961

KEYPORT
KEYBOARD/MONITOR MULTIPLEXOR

ORGANIZE and CONTROL MULTIPLE PCs with a SINGLE MONITOR and KEYBOARD



Best Price/Performance Ratio For Your Investment

- AUTO-SCAN FEATURE
- OPTICAL ISOLATION FOR SAFETY & PROTECTION
- MICRO CONTROLLED SCAN CODE SELECTION
- SINGLE BOX SOLUTION
- CABLES INCLUDED—NO HIDDEN COSTS
- OPTIONAL MOUSE MODULE

ASK ABOUT SERVER DECK
A rack for housing multiple CPU's with a single keyboard and monitor.

Made Better In The U.S.A.
13 Trade Zone Drive, Ronkonkoma, NY 11779
Fax: (516) 981-3828

Connect Tek Inc.
(516) 981-3311

Product names mentioned herein may be trademarks and/or registered trademarks of there respective companies.

Our free audit kit can keep you out of jail.

Network Administrators: Did you know that noncompliance with software license agreements can be a FELONY, if you have just 10 illegal copies of software worth just $2500? That your company can be fined up to $250,000 or that YOU could go to jail for up to 5 years? That the Software Publishers Association took action against 747 companies in 1992 alone, resulting in $3.9 million in fines?

Don't wait for the SPA to knock on your door. Audit your software usage now with hDC Express Meter Audit Kit, a comprehensive audit program that tells you if you're using your software legally and shows you how to dramatically reduce software costs. And if you're a qualified network administrator, we'll send you an Audit Kit for **FREE!**

hDC For your FREE audit kit, call 800-321-4606, 9-5 PST, or fax us at 206-881-9770. ANW1

CERTIFY UTP FOR 10BASE-T

NX-203 10BASE-T Tester Kit

Only! $375

Certifies UTP to IEEE 802.3
Instantly tests wiring for:
- NEXT (crosstalk)
- Attenuation
- Continuity

PINPOINT
FOR INFO CALL:
TEL: 510-462-0292 FAX: 510-462-0781

3COM...SMC...INTEL...NOVELL...EAGLE...NETWORTH

BUY • SELL • REPAIR • NEW • USED • EXCESS

3Com ETHERNET | **BRIDGE COMMUNICATIONS TOKEN RING** | **NOVELL FIBER**

- We Sell 3Com Up To 80% Off List
- We Sell All 3Com Hardware and Software
- We Sell 3Com/Bridge Parts and Peripherials
- We Warranty All Products!

We Stock All 3Com Servers, Memory, Expansion Cab., Disk/Tape Drives, Motherboards, Power Supply, Multiconnect, Netbuilder, CS, NCS, IB, 3Station

Current Specials on New Ethernet & Token Ring

	3COM	INTEL	CLONE	NOVELL	SMC
8 BIT COAX OR TP	130	125	85	130	115
16 BIT COAX OR TP	130	125	90	140	125
TOKEN RING 16/4MB	425	450	325	•	375

QUALITY DISCOUNTS AVAILABLE!

FIBER MADNESS!!!!!
WHILE SUPPLIES LAST:
FIBER CABLE ST/SM/BICONIC
REPEATERS/SPLICERS/MISC.
CALL FOR LOW LOW PRICES!

NEW ETHERNET STUFF

8	PORT 10BT HUB	$280
12	PORT 10BT HUB	495
2	PORT REPEATER	475
4	PORT REPEATER	595
	POCKET ADAPTER	250

NEW ETHERNET BRIDGES - LOCAL $1500/REMOTE T1 $3200
**********GREAT DEAL**********

USED 3COM ADAPTORS

501 ELINK	$75	503TP	$125
503 ELINK II	100	523TP	195
505 ELINK +	265	507TP	215
523 ELINK/MC	145	543NB	195
527 ELINK/32	375	603TOK	200
507 ELINK 16	165	605TOK +	250

NEW SYNOPTICS

1000-01 CONC.	$350
2530 CONC.	475
3000-01 CHASSIS	1200
3030-04 CHASSIS	650
505 XNCVR.	85
2510 CONC.	475

OTHER GOOD USED STUFF!

CABLETRON MT800 8 PORT XNCVR.	$400	3Com REPEATERS	$550
IBM ETHERNET ADAPTOR RISC 6000	350	PROTEON MAU	250
CDC WREN III 182MB DISK	500	PROTEON 16/4MB	275

ERGONOMIC INC.
SALES: 800-AKA-3COM (800-252-3266) - PURCHASING 516-293-5200
FAX: 516-293-5325 47 WERMAN CT. PLAINVIEW, NY 11803
WE BUY AND SELL NEW AND USED NETWORTH CORPORATION EQUIPMENT!

Novell NetWare® 4.01 at up to 50% off!!

We are offering excess NetWare® 4.01 25, 50 and 100 user versions only, at the following costs:

25 user $2399*
50 user $3099*
100 user $4729*

***Free shipping/Further quantity discounts apply**

Lowest Prices anywhere!!!

All are brand new/complete/Novell sealed packages. These are the regular RED boxed latest version Novell products; not the OEM versions-Guaranteed!

1-800-998-8371
CountryWide Liquidators
Satisfaction always guaranteed!
(References of our customers available)

Why Pay More?

Keep this on file for your future purchases

SDLC, LAPB, PPP, BISYNC, ASYNC

LINK PROTOCOL API

- Platforms: UNIX, DOS, OS/2
- Multi Port Intelligent Card
- Speed up to 56kbits/sec
- Leased/dialup line (V.32, V.25bis)
- TLI/XTI Interface on UNIX
- Menu Driven Configuration
- Similiar Interface on DOS, OS/2
- User Configurable Link Protocol
- **Also available:**
  X.25 DTE, ASYNC PAD
  SNA 3270,LU0, APPC

Digital Technology
(617) 229-9797

Ethernet	Ethernet	Ethernet
GenTech	**1-800-277-3679**	
NE2000 Comp., 8/16 Bit Autodetect (UTP or BNC)/Combo		$45/49 10+
NE2000 + Comp. JUMPERLESS (UTP or BNC)/Combo		$53/58 10+
Lantastic AI 2 Node Starter Kit/Netware Lite Kit		$275/225
10Base T Concentrator 14 Port/ 9 Port		$355/205
Repeater 2 Port/4 Port (BNC and AUI)		$265/405
RG58 Cable UL,CSA CL2 Compliant PVC/Plenum		13¢/35¢
10Base T Cable UL,CSA Lvl3/ Lvl4 PVC		7¢/9¢

100% Tested, Same Day Shipping. Call for Other Ethernet Products

14140-E Parke Long Ct. Chantilly, VA TEL: (703) 263-0304 FAX: (703) 378-6813

NETWORK
BUY / SELL / REPAIR

IBM 3Com SMC SynOptics proteon

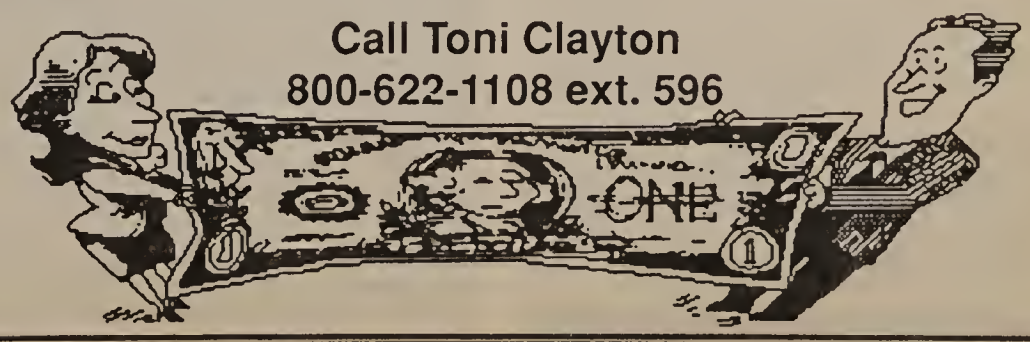
COMSTAR Buys and Sells Excess and Used NETWORK Equipment.
NIC's/3270-5250 Emulation/MAU's/Hubs

COMSTAR, INC.
The #1 NETWORK Remarketer
1-800-735-5502
FAX: 612-835-1927
5250 W. 74th St., Minneapolis, MN 55439
IBM, 3Com, SMC, Proteon and Synoptics are Registered Trademarks.

S - T - R - E - T - C - H

Your Advertising Dollar!

Get the most out of your money by advertising to a highly qualified & targeted circulation! *Network World's* 150,100 readers!!



Call Toni Clayton
800-622-1108 ext. 596

Networking Careers

Bell Atlantic/TCI deal raises furor on Capitol Hill

BY ELLEN MESSMER

Washington, D.C.

In the merger with cable operator Tele-Communications, Inc. (TCI), Bell Atlantic Corp. is carefully avoiding becoming embroiled in the 1984 Cable Act, but legal trouble may be lurking as some in Congress fume over antitrust issues.

The Cable Act prohibits joint ownership of cable and telecommunications facilities in the same serving area, so in spite of a recent court victory in August, Bell Atlantic will not be buying TCI cable facilities in states where its local exchange carriers provide land-line telephone service.

But while Bell Atlantic carefully avoids the pitfalls of the Cable Act in what may be an effort to win public support, problems with the long-distance ban imposed by the Modified Final Judgment could still throw a monkey wrench into the deal.

Bell Atlantic estimates that it will take a year for the merger to make it through a regulatory gauntlet that includes the Federal Communications Commission, the Department of Justice and state regulatory agencies. But some powerful members of Congress have already declared war on the deal, vowing to stop it.

"This deal may be the biggest ever, but mega-merger mania is sweeping through the telecommunications industry, and Congress and the administration had better step in before it's too late," said Sen. Howard Metzenbaum (D-Ohio), head of the Senate Judiciary Commitee.

Metzenbaum called the merger a "mega-monster." "I intend to convene hearings before the Senate antitrust subcommittee to examine this ominous trend," Metzenbaum said. "I am calling on the Justice Department and the Federal Trade Commission to investigate and block this merger if consumers would be overcharged. The phone companies promised us robust competition, but instead of trying to beat the cable giants, they want to join them, and consumers will be the losers."

Another member of Congress, Rep. Edward Markey (D-Mass.), expressed concern about the merger, saying he would conduct hearings in the House on the matter.

However, others in government were more sanguine about the merger. FCC acting Chairman James Quello called the merger "the most momentous deal of the decade. It has the constructive potential to expedite the initiation of competitive super electronic highways with multichannel, multifaceted service to the public," Quello said.

Quello also said the FCC wouldn't "prejudge the matter" and would examine the agreement in light of the cable and telephone cross-ownership rules and the video dial-tone rules. "In the end, this issue may well be decided by legal challeges brought about by courts and Congress."

Bell Atlantic, under the aegis of its local-exchange company Chesapeake and Potomac Telephone Co. (C&P), won a major legal victory last August concerning video programming. C&P persuaded the U.S. District Court in Alexandria, Va., to overturn the part of the Cable Act that prohibits telephone companies from providing video programming to subscribers within their own service areas.

The judge made the decision based on constitutional grounds, saying the prohibition of video programming violates the Bell Atlantic's constitutional First Amendment right to free expression. The judge later clarified that the ruling only pertains to Bell Atlantic, not other telephone companies.

"It gives us the right to be cable programmers over our own facilities in the region," said Bell Atlantic spokesman Eric Rabe. So far, Bell Atlantic has received no legal challenges to the ruling, but the company is braced to continue the fight in appeals courts, if necessary.

The MFJ decision that broke up the AT&T Bell system in the early 1980s could be interpreted as prohibiting the regional Bell holding companies from transmitting video programming signals long-distance, Rabe acknowledged. Cable programming involves transmitting video signals long-distance over satellite, fiber and microwave.

"The law is not clear on this," confirmed Stuart Brotman, an attorney who specializes in cable and telecommunications issues with the Washington, D.C. law firm Winthrop, Stimson, Putnam and Roberts.

Bell Atlantic plans to file a waiver request with U.S. District Court Judge Harold Greene in Washington, asking for a blanket waiver for long-distance video programming. The blanket waiver is intended to erase legal doubts about Bell Atlantic's ability to send video signals across local access and transport area boundaries. If Greene denies the waiver, the deal will fall apart.

According to Southwestern Bell Corp., the Bell Atlantic deal with TCI underscored the need to lift the MFJ restrictions on long distance.

John Malone (l.) and Raymond Smith

Merger

Continued from page 8

sive, Bell Atlantic plans to use ADSL to enter the full-service network market, according to Ray Albers, Bell Atlantic's assistant vice president for technology planning. However, recent court rulings allowing Bell Atlantic to provide video programming in its region have changed the economics of fiber deployment, he added.

"With the court relief and the TCI merger, we probably can start being a lot more bullish about going in with fiber," Albers said.

Bell Atlantic has been deploying fiber most aggressively in New Jersey. The company plans to start up a fiber-optic network next year that will provide 8,000 residents in Morris County, N.J., with telephone service, CATV and other information services.

Bell Atlantic plans to start up a fiber-optic net next year that will provide 8,000 residents in Morris County, N.J., with information services.

The New Jersey pilot system takes a video feed from a CATV provider, converts it to digital and then runs it through T-3 trunks to roughly 50 host digital terminals, each of which serves around 250 subscribers.

Those digital terminals also serve as the interconnection point for the telephone network. The combined voice and video traffic then runs over fiber to optical network units at curbside, which support four to eight links to subscribers via coaxial and twisted pairs.

A 16K bit/sec channel back to the net control center connects users to the network management system for such applications as pay-per-view.

On the network, New Jersey Bell Telephone Co. gave CATV supplier Sammons Communications, Inc. a 10-year lease on the network. Sammons will have 60 of the system's 64 64M bit/sec video channels. The system will eventually support 300 video channels; the network's theoretical capacity is 1,500 channels. New Jersey Bell is scheduled to complete work on the network next year.

Morris County will be the model for Bell Atlantic in all its major markets, Albers said. Full-service networks are inherently capital-intensive, and in many of the markets, the company may choose to do only video for now, he said. However, the company will install fiber and electronics for both voice and video, and when the current voice network's copper plant is ready for rehabilitation, it will be able to make the connection.

Debate brewing over merger

Continued from page 1

is prohibited from owning cable systems in its own area, but a recent Alexandria, Va., court decision in August appears to give Bell Atlantic the right to provide cable services and video programming.

Bell Atlantic operates as a local exchange carrier in six states and the District of Columbia. TCI is the world's largest cable television provider, serving more than 20% of domestic cable customers. Together, Bell Atlantic and TCI will have a presence in 59 of the top 100 U.S. markets, covering 22 million cable and telephone customers.

USER REACTION

"I'm bringing in a supply of Tums and blood pressure medicine of some sort because the rate of change will be increasing," said Dick Bradner, manager of network/office services at Progressive Insurance Co. in Cleveland.

"Actually, this is really good," Bradner said. "It opens up many new doors, especially in video teleconferencing. With Viacom [Cable], TCI and the RBOCs getting into it, hopefully what we are going to see is fiber to the location, big bandwidth and cheap pricing now.

"It's going to heat up this whole bypass issue. That's one of the things that's got me excited," he con- tinued. "You've got a whole bypass issue that is coming to life. As a telecommunications manager, anybody who is worth their salt and has any bandwidth requirements is looking at bypass."

GONOS

But will all of this come at the expense of competition and innovation? "Our concern with large mergers like this one is how open and competitive the market will be," said Jerry Johnson, a standards analyst with the Texas department of information resources.

"We can't afford to create informational 'haves and have-nots,' where the haves in large metropolitan areas receive these advanced [voice and video] services and the have-nots in rural areas get cut off because it's not cost-effective for large conglomerations to provide service to those areas," he said.

"Do we really want two to four Goliath companies providing all of the advanced services," Johnson said. "How many Davids will be toppled in the process? The Davids provide the competition that will ultimately keep the Goliaths honest. Competition is key."

"These companies are long on promise but short on detail," said Daniel Gonos, telecommunications manager for Domino's Pizza, Inc. in Ann Arbor, Mich., which has 4,800 stores in the U.S. "I don't think the cable TV folks know anything about telephony."

Terry Gardner, project engineer for digital transmission systems at Florida Power Corp. in St. Petersburg, Fla., raised the issue of information highways.

"The merger between a large RBHC and the largest independent cable company provides a lot more interest in getting facilities to the home, but I don't believe cable is the correct medium," according to Gardner. "I'm more of a believer in twisted-pair or fiber optic-based service, mainly due to better reliability."

BY NETWORK WORLD STAFF

Comments

If you have a comment on this or any other article, drop us a fax at (508) 820-3467 or call (800) 622-1108, Ext. 487.

Group meets on PCS problems

Users and vendors met here last week to determine whether a band of empty frequencies — a sort of dead zone — needs to be established around the spectrum for data personal communications services (PCS) to prevent any interference with private microwave or wireless private branch exchange systems.

The network executives were part of an ad hoc technical unit organized under the Unlicensed Transition and Management (UTAM) group, which is charting a migration course for microwave users who are being forced to move off their current spectrum allocation to make room for new wireless PCS services.

The group comprises representatives from several microwave user groups, including the American Petroleum Institute (API), Energy Telecommunications (ENTELEC) and the Utility Telecommunications Council (UTC), as well as representatives from AT&T, Northern Telecom, Inc. and Motorola, Inc..

The Federal Communications Commission recently allocated spectrum for companies that plan to provide data PCS services (*NW*, September 27, page 1). PCS companies will buy frequencies from the U.S. government in an auction and pay the cost of setting up displaced microwave users in another band.

But the data PCS band falls in between the frequencies allotted for wireless PBXs. Makers of wireless PBXs and microwave network users who have not migrated to new frequencies are concerned that data PCS service could cause interference with their networks and are examining the viability of so-called guard zones — essentially dead air — around the data PCS band that would prevent problems.

However, those guard zones would eat into the available airwaves for data PCS and could limit the appeal to potential players. If the number of new players entering the market is limited, the funds available for migrating microwave users off the spectrum could be tight.

Some revenue from the sale of wireless PBXs would be passed to UTAM for use by data PCS providers to buy out other microwave users.

"But if the data PCS [providers] decide not to offer products because of the reduced spectrum, who's going to replenish the kitty?" asked Rick Smith, a network manager with Texaco, Inc., which hosted the meeting and is an API member. "I don't think the wireless PBX vendors can go it alone."

Having detailed its spectrum plans in mid-September, the FCC wants nothing to do with interference problems, disputes between users and PCS firms or studies.

"We're staying out of this unless there's a huge unsolvable problem," said Tom Stanley, the FCC's chief engineer. "We strongly encourage the parties to handle things through negotiations because [the FCC] doesn't want to play intermediary."

The UTAM group hopes to complete its study by year end.

BY BOB WALLACE

Interoperability concerns cloud PCS' prospects

BY ELLEN MESSMER

Washinton, D.C.

Although the FCC has just blessed personal communications services (PCS) by allocating radio spectrum to the emerging technologies, PCS' future is already clouded in uncertainty.

By May, the Federal Communications Commission will auction off the frequencies allocated to PCS under a plan that would create as many as seven PCS providers per market in hundreds of regions. Because there are no standards for PCS, there is a possibility that thousands of PCS fiefdoms will arise — each armed with proprietary systems — in a balkanized service market with little appeal to users.

What is PCS?

Personal communications services will include everything from simple voice and data offerings to wireless LANs.

Those and other potential problems came into sharp focus at the PCS Summit hosted last week by the Institute for International Research, where vendors sparred over PCS interface standards. Some argued that "islands of PCS" are just fine, but others say incompatibility problems will be the death knell for this promising business.

"Market research says coverage, coverage, coverage," said Doug Smith, president of Omnipoint Corp., the Colorodo Springs-based start-up designing PCS equipment. "People don't want islands of coverage."

While convening to mull over the outlook for PCS, representatives from McCaw Communications, Inc., QUALCOMM, Inc. and Ericcson Radio Systems resurrected the standards battle over Time Division Multiple Access (TDMA) and Code Division Multiple Access (CDMA) that has preoccupied the cellular industry for three years.

This war in the U.S over the TDMA and CDMA air interfaces, both of which are Telecommunications Industry (TIA) standards, has left the cellular industry in divided camps and has assured that the next generation of cellular equipment will not be interoperable. Long fought in the 900-MHz cellular bands, the TDMA/CDMA battle is spreading north to PCS at 2 GHz.

Even as a free-for-all threatens to erupt in the U.S. over PCS, European nations and others around the world are backing a standard known as Global Systems for Mobile Communication (GSM), adapting it for both traditional cellular and new PCS being rolled out in Germany, the U.K. and elsewhere.

In contrast to most countries, U.S. regulatory authorities will stay out of the battle, with hope that the free market will choose a winner. "We're avoiding this, as with the TDMA vs. CDMA debate," said Tom Stanley, FCC chief engineer. "This is really the industry's decision. Except for power limitations, we won't wander into this area."

PCS air interface proposals are due by Nov. 1 to the new TIA standards committee TR46, created to define the 2-GHz PCS standards. "You can expect there will be a CDMA proposal, a GSM DSC-1800 one and several more," said Rich Miska, technical manager of PCS networks and applications at AT&T's PCS division. "This time it's even worse than cellular."

Omnipoint's specification for handsets and base stations is also likely to be submitted. AT&T is expected to submit at least two proposals for review. The group wants to have a final ballot by spring, but even if it manages to choose an air interface standard, vendors are not compelled to adopt it.

Cellular carriers planning to deploy TDMA or CDMA equipment want the same interface for PCS since they could simply modify their networks to run PCS voice.

"The U.S. is falling behind the rest of the world in wireless," warned Richard Siber, group director of mobile and wireless communications at consultancy BIS Strategic Decisions. "We could run into a problem where people don't purchase since there's no standard."

Some cellular service providers, now eyeing the possibilities of PCS, are fed up.

"There's no open architecture," said Neil Cox, vice president of wireless at Ameritech's international division, who noted that the way the TDMA and CDMA standards are implemented in cellular equipment today, the network provider is locked into a vendor for life. "Hopefully, we can adopt a [PCS] standard that allows competition and cheaper infrastructure costs."

It took Ameritech six months to install a new GSM system in Norway. "Europe is all open architecture, so when you want to build in the next year, you just put out a request for proposal and take the low bid," Cox pointed out.

Microwave

Continued from page 1

president of marketing and development at Locate, Inc., a vendor of microwave equipment and a competetive-access provider in New York City that is experimenting with PCS.

Locate, Inc. has reached agreements with all the owners of the microwave nets, promising to replace their often aging analog systems with new digital microwave equipment if Locate wins a PCS license. The cost to Locate for replacing the nets: some $30 million.

"The Suffolk Country Police Department on Long Island has an aging 18-hop microwave network at or near capacity," Curtin said. "We've redesigned their network in a ring architecture, and we have an agreement that if we win a license — God help us — we'll move them."

That is good news for the county, which is strapped for both cash and new network capacity.

Locate has a similar deal with the Long Island Lighting Co., with which Locate hopes to start a joint PCS venture. Other companies Locate has reached agreements with include San Diego Gas & Electric Co. and the Puerto Rico Power Authority.

Utilities control rights-of-way in many areas and could mount PCS microcells on their lines in joint ventures with PCS providers.

The FCC estimates that there are about 23,000 microwave links in the bands set aside for PCS and migration costs for moving microwave users run from an estimated low of $100 million to $3 billion.

Although microwave users are usually told to vacate, the FCC made an exception for public-safety users, giving law enforcement the right to keep their microwave system operating in the 2-GHz bands permanently.

These public-safety users represent 30% to 40% of the microwave users in certain areas, said Tom Stanley, FCC chief engineer last week. But Stanley said the FCC is confident most will cash out and get free equipment in exchange for exiting the bands.

However, if a substantial number of public-safety users exercise their right to remain in the 2-GHz bands, that could affect the outcome of the spectrum auctions the FCC will hold to drum up money for the U.S. Department of the Treasury. The existence of a microwave user could steeply devalue a particular allocation owing to the potential of interference between the PCS and microwave systems.

NETWORK WORLD

161 Worcester Road
Framingham, Mass. 01701-9172
(508) 875-6400

Second-class postage paid at Framingham, Mass., and additional mailing offices. *Network World* (USPS 735-730) is published weekly, except for a single combined issue for the last week in December and the first week in January by Network World, Inc., 161 Worcester Road, Framingham, Mass. 01701-9172.

To apply for a free subscription, complete and sign the qualification card in this issue or write *Network World* at the address below. No subscriptions accepted without complete identification of subscriber's name, job function, company or organization. Based on information supplied, the publisher reserves the right to reject non-qualified requests. Subscriptions: 1-508-820-7444.

Non-qualified subscribers: $5.00 a copy; U.S. — $95 a year; Canada — $117.70 (including 7% GST, GST #126659952); Central & South America — $110 a year; Europe — $165 a year, all other countries — $245 a year (airmail service). Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Please include mailing label from front cover of the publication.

Network World can be purchased on 35mm microfilm through University Microfilm Int., Periodical Entry Dept., 300 Zebb Road, Ann Arbor, Mich. 48106.

Network World is distributed free of charge in the U.S. to qualified management or professionals who specify and maintain communications equipment, including voice, data and video, as well as to common carriers, consultants, systems houses and manufacturers of communications equipment.

POSTMASTER: Send Change of Address to *Network World*, P.O. Box 3090, Northbrook, IL 60065.

ISSN number: 0887-7661.

REASON #301

AT&T's new 800 Service Features and better productivity— there's definitely a connection.

When customers get busy signals, they may hang up—which can make your productivity picture look less than beautiful. Fortunately, AT&T's developed innovative new 800 Service Features that can help your business manage more calls, efficiently and effectively...all *without* buying and maintaining premises-based equipment and additional lines.

Say, for example, you're experiencing heavy call volume. AT&T can put callers at ease with a customized announcement letting them know all agents are busy and they'll be connected to an agent soon. It's called "Network Queuing" and it helps your business get more calls through, efficiently distribute incoming calls and effectively handle calling volume peaks. It's an exclusive AT&T 800 SERVICE feature. You simply won't find a network solution like it anywhere else.

Network Queuing. More than a sound business decision—a direct connection to greater productivity. For more information about this and other new AT&T 800 Service Features, call your Account Executive or 1 800 222-0400.

Network Queuing. One of the 800 reasons℠ to choose AT&T 800 Service.

AT&T. The Best in the Business.℠

AT&T

Considering how our phone systems affect revenues, perhaps we should consider a new design.

How would you like a phone system that's designed not only for making calls, but for making money? One that lets you pick up any line, even your bottom line?

Sound interesting? Then a ROLM system will sound downright fascinating.

In the case of C.R. England & Sons, Inc. trucking company, ROLM helped them haul in a 26% increase in annual revenues. Then there's Acme Premium Supply Company. A ROLM system supplied them with a 25% increase in annual sales.

With customer after customer, we hear the same story. They can handle more calls in less time without adding people.

Lost customer calls are being recovered. And the sales just keep rolling in.

It's not simply that ROLM can offer more sophisticated features than other PBX vendors. We can. But we also take a more intelligent approach to putting those features together. We take time to study your business. Find out how it all works. Then we develop a customized solution that helps your business work faster. Leaner. More profitably.

Call us at **1-800-ROLM-123** to learn more. We'll send you a free video featuring a number of ROLM business success stories.

Once you see for yourself how our phone systems are ringing up sales, we're sure you'll find our design is just fine as is.

ROLM is part of the Siemens family. The world's largest private communication systems manufacturer.

ROLM
A Siemens Company

Network World Upcoming Editorial (October — December)

Issue Date	Ad Close	Feature Editorial	Special Sections	Bonus Distribution	Special Services
Oct 25	Oct 13	Buyer's Guide: Remote LAN Access			Lead Service
		Security Test Series			
Nov 1	Oct 20	The Impact of ATM		CMA	*Harvey Ad Study*
Nov 8	Oct 27	Buyer's Guide: T-1/T-3 Muxes			
Nov 15	Nov 3	Survey: LANs: Who's in Charge?	LAN World	Comdex Fall/COS Users' Forum	Lead Service
Nov 22	Nov 10	User Excellence Awards			
		Network Test Series			
Nov 29	Nov 17	Buyer's Guide: SMDS Services			Lead Service
		Security Test Series			
Dec 6	Nov 24	Buyer's Guide: Imaging		DCI DB World/Chicago	
Dec 13	Dec 1	DCE/DME's Impact on Networks	LAN World		Lead Service
Dec 20	Dec 8	Buyer's Guide: Packet Switches			
Dec 27/Jan 3	Dec 15	1993 Critical Issues Survey			
		Security Test Series			

Getting More Ad Inquiries

If you want lots of inquiries from your print ads, Bob Bly offers proven guidelines in his new book, *Business to Business Direct Marketing.*

Here are some techniques that should work for both consumer and business advertising:

- Ask a provocative question in the headline. Example: "When an Employee Gets Sick, How Long Does It Take Your Company to Recover?"
- Give or promise the reader useful information in the headline and deliver it in the copy. Example: "7 Ways to Collect Your Unpaid Bills."
- Use a news- or time-related tie-in. What works: "How to Make $85,000 a Year" is good, but "How to Make $85,000 This Year" is better.
- Offer a free booklet or other bait piece in the ad. The more you stress this offer, the higher your response will be. Tip: Close the ad with something such as "Get the Facts — Free" and include a picture of the booklet or report cover.
- Put a coupon in a large ad. In ads of one-half page or less, put a dashed border around the ad to simulate the look and feel of a coupon. ▮

Source: *Business to Business Direct Marketing,* by Robert W. Bly, NTC Business Books, 4255 W. Touhy Ave., Lincolnwood, IL 60646

Be Sure That You Follow Up

Some statistics that should cause sales and marketing people to shudder:

- 87 percent of ads people responded to were never followed up by a sales contact. When a contact did occur, it took an average of 89 days.
- 23 percent of requests for product literature were never fulfilled.

Performark Inc. responded to more than 15,000 ads in business publications and tracked the results. The company concluded that more than 90 percent of the sales potential would have been lost because of insufficient follow-up. ▮

Source: Bob Van Voorhis Jr., writing in *TeleProfessional,* 209 W. 5th St., Ste. N, Waterloo, IA 50701

And the Winners are . . .

Network World salutes the winners of the 1993 Enterprise Technology Awards who were chosen by actual users of network products and services.

Local Area Networks

Adapters
- Ethernet.....**3Com Corp.**
- FDDI.....**Cabletron Sys., Inc.**
- Token Ring.....**IBM**

Bridges.....**Cabletron Sys., Inc.**
Routers.....**cisco Sys., Inc.**
Intelligent Hubs.....**SynOptics Comm., Inc.**
LAN Diagnostic/ Management Tools.....**Novell, Inc.**
LAN Servers.....**Compaq Comp. Corp.**
Superservers.....**Compaq Comp. Corp.**
Net. Operating Systems.....**Novell, Inc.**
Peer-to-Peer Nets...**Novell, Inc.**
Wireless LANs.....**Motorola, Inc.**
Apple Conn. Products.....**Apple Comp., Inc.**

Software

Client/Server Appl.Dev. Tools.....**Oracle Corp.**
Comm. Software....**Datastorm Tech., Inc.**
DBMS (Database Mgmt. Sys.)...**Borland Inter., Inc.**
E-mail Software.....**Lotus Dev.Corp./cc:Mail**
E-mail Switches.....**Novell, Inc.**
Group Coll. Software.....**Microsoft Corp.**
Middleware.....**IBM**

Wide Area Networks/Equipment

DSU/CSU.....**AT&T Paradyne**
High-Speed Modems (9.6K & above).....**Hayes Microcomputer Products, Inc.**
Imaging Sys. .....**IBM**
Integrated Net. Mgmt Sys.....**Hewlett-Packard Co.**
Multiplexers.....**Motorola Codex**
Packet Switches.....**Motorola Codex**
PBXs.....**AT&T**
Videoconf. Sys.....**AT&T**
Voice Messaging Sys.....**AT&T**

Wide Area Networks/Services

800 Services.....**AT&T**
Digital Private Line Services.....**AT&T**
Frame Relay Ser. ...**AT&T**
ISDN Services.....**AT&T**
Switched Digital Services.....**AT&T**
Value-Added Net. Services...**AT&T**
Virtual Net. Services.....**AT&T**

Considering how our phone systems affect revenues, perhaps we should consider a new design.

How would you like a phone system that's designed not only for making calls, but for making money? One that lets you pick up any line, even your bottom line?

Sound interesting? Then a ROLM system will sound downright fascinating.

In the case of C.R. England & Sons, Inc. trucking company, ROLM helped them haul in a 26% increase in annual revenues. Then there's Acme Premium Supply Company. A ROLM system supplied them with a 25% increase in annual sales.

With customer after customer, we hear the same story. They can handle more calls in less time without adding people.

Lost customer calls are being recovered. And the sales just keep rolling in.

It's not simply that ROLM can offer more sophisticated features than other PBX vendors. We can. But we also take a more intelligent approach to putting those features together. We take time to study your business. Find out how it all works. Then we develop a customized solution that helps your business work faster. Leaner. More profitably.

Call us at **1-800-ROLM-123** to learn more. We'll send you a free video featuring a number of ROLM business success stories.

Once you see for yourself how our phone systems are ringing up sales, we're sure you'll find our design is just fine as is.

ROLM is part of the Siemens family. The world's largest private communication systems manufacturer.

ROLM
A Siemens Company

Circle Reader Service #11

The Wrap-up

NETWORK WORLD

Focusing on Reader Services

Network World's sole mission is to be the most valuable source of information for the Network IS professionals who design, build and manage today's enterprise networks. Since our inception in 1986, *Network World's* mission has been consistent as we continue to cover the strategic use of network technology in an approach unique to the industry — from the user's perspective.

But *Network World* offers our readers much more than timely, reliable coverage of the full spectrum of products and services driving today's networks. We also provide users a variety of services designed to help Network IS professionals conquer the many challenges of effectively managing their enterprise networks.

Network World is committed to promoting the interests and airing the concerns of network users. *Network World's* Reader Advocacy Force (RAF) was introduced to back up that commitment. RAF comprises a team of reporters and editors who address key issues facing users of network products and services. This team serves as the voice of network buyers, spotlighting product problems, service and support concerns, and interoperability issues.

Network HELP desk

Network Help Desk, which premiered in the June 21, 1993 issue of *Network World*, is another example of *Network World's* dedication to consumer advocacy. Appearing on page 2 of every issue, Network Help Desk investigates user problems regarding products, services, technologies, management issues or disputes with vendors.

Network World's Buyer's Guides help readers with their purchase decisions. Focusing on a wide spectrum of networking products, and services, Buyer's Guides lead readers through the process of buying network equipment and services. *Network World* recently added a new Buyer's Guide Editor, Barbara Wierzbicki, and plans to augment our Buyer's Guide staff with consultants and analysts to provide more practical insight into the many selection criteria necessary to understand the buying process.

Meanwhile, reader focus groups confirm that testing has become an invaluable source of product information to our readers. As a result, *Network World* has added its first Testing/Reviews Editor. Stuart Melnitsky joins our staff in this position and will coordinate an enhanced *Network World* Test Alliance and product review program. This will be done utilizing industry experts, network integrators, universities and readers. Product reviews and testing will span the following areas: Enterprise Internetworks, LANs, Global Services and Client/Server Applications. As head of the *Network World* Test Alliance, which was founded last January, Melnitsky will continue to combine the experience of industry experts and real-world testing environments, drawing on the expertise of the program's partners: Telechoice, Inc., National Computer Security Association, Harvard University and the University of Colorado at Boulder. The *Network World* Test Alliance provides users with practical, objective information on today's networking products and services. Further alliances will be forged in the coming year.

In order to provide services like the ones mentioned above, a publication must maintain a constant pulse on its readers' interests. With *Network World's* Electronic Bulletin Board System (BBS), we are in constant contact with our readers. By simply dialing up our BBS, readers can submit letters to the editor, pass on tips, leave change of address requests, and interact with other readers as well as *Network World* editors. The BBS also allows users to take advantage of NetACCESS, our innovative interactive advertising program permitting callers to download demonstration copies of products for a trial run. For our readers, this means direct access to the latest products they need to keep their networks growing and competitive.

The list of user-focused services goes on — Network Innovators, In a Nutshell, Annual Budget and Salary surveys — but they all serve one common purpose. They provide readers with the most valuable information on designing, building and managing enterprise networks. They are what makes *Network World* the most useful publication among Network IS professionals. ▮

1994 Buyer's Guides

Issue Date	Feature Editorial
Jan 10	Software distribution, licensing
Jan 24	Voice Messaging
Feb 7	Frame Relay Services
Feb 14	LAN Backup Systems
Feb 28	E-mail
Mar 14	Virtual Nets
Mar 21	100M bit/sec Option
April 4	High Speed Modems
April 18	Networking Operating Systems
May 2	Intelligent Wiring Hubs
May 16	T-1/T-3 Fractional T-1/ T-3 Services
May 23	Relational DBMS Servers
June 6	LAN Management Systems
June 27	Superservers
July 4	Internet Access Providers
July 25	Document Management Systems
Aug 1	Net Management Applications
Aug 15	800 Services
Aug 29	Groupware/Workflow
Sept 12	Routers
Sept 19	ATM Products
Oct 3	Switched Digital Services
Oct 17	Net Management Platforms
Oct 31	Videoconferencing
Nov 14	Remote LAN Access
Nov 28	T-1/T-3 Multiplexers
Dec 12	Imaging

Inside

The Evolution of the Network IS Market

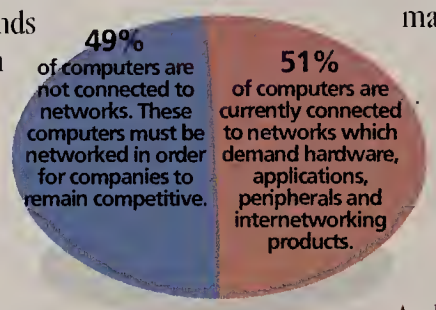
Enterprise networking is here — and here to stay. And a new buying frenzy has begun as the network becomes the applications platform of the '90s.

It's been said that history repeats itself. That being true, vendors of networking products and services must prepare for the incredible sales opportunities that are arising as Network IS professionals interconnect departmental, corporate, local and remote network resources to create an enterprise wide utility.

It started in the 70s with the installation of mainframes and minis. Anxious to take advantage of their expensive, yet empty machines, DP professionals bought an abundance of software and peripherals in their quest for technological savvy.

In the 80s, pcs were prevalent. Recognizing they could not use the same software and peripherals from their mainframes and minis for their pcs, users flooded the market buying the latest applications and peripherals.

Confusion was rampant in the mid 80s as these separate islands of technology emerged. In spite of the prevailing chaos, management demanded departmental productivity. Thus, the LAN was born and a brief buying surge occurred as they proliferated.



By far the biggest spending wave was to happen in the late 80s and early 90s as network and MIS professionals began to interconnect LANs and tap into information hosts through corporate backbone networks. The new applications platform was well on its way.

In the 90s, networking has evolved from an industry trend to a strategic imperative for business leaders in every industry. The survival and success of every organization depends on information sharing. Today more than 50% of all computers are connected to networks, establishing the enterprise network as the new applications platform. And another buying frenzy is about to occur as the standalone products of the 70s and 80s simply won't make it into today's enterprise computing environments. This network aftermarket represents the greatest technology sales opportunity in history, because those who buy for the network will buy in volume as they buy for multiple users at multiple sites.

Defining Network IS

Who is responsible for these enterprise network environments? Network IS professionals. Regardless of their titles, these professionals are charged with building and maintaining their enterprise networks, and play an increasingly important role in shaping tactical business decisions. They are called upon to oversee the billions of dollars invested in network technology every year. They formulate network purchase policies, and establish approved brand and vendor lists. And they approve the purchase of products and services to ensure total compliance with both existing and planned technology standards.

With complete control over their companies' expanding networks, Network IS professionals buy in volume for multiplatform, multisite networks within their organizations. And they purchase a wide breadth of products and services, including the multiplatform applications needed to make their networks run. Their responsibility to both end users for information delivery and to Executive IS, PC IS and corporate management for adherence to standards exclusively provides Network IS professionals with the "big picture perspective." This puts them at the center of purchasing for the enterprise.

This means Network IS is the market to sell to in the 90s.

Network IS professionals depend upon reliable, timely and accurate information to keep them up-to-date on changes affecting the enterprise network. They require in-depth coverage of the full spectrum of products and services driving today's networks. They look for buyer's guides and testing results. And they rely on *Network World.*

Network World's Market Information Database confirms that our subscribers spend $7 million annually, have buying responsibility for an average of 29 sites, and purchase an average of 33 different products and services for their networks each year. Their scope of purchase involvement is just as impressive:

- 95% of our readers purchase LANs
- 92% purchase computers/peripherals
- 93% purchase software
- 83% purchase WANs and
- 76% purchase internetworking products

They are the Network IS professionals who control the over $359 billion estimated to be spent on information technology in the U.S. alone this year.

Reach Network IS with Network World

In today's world where the network is everything, *Network World* is the one publication that means everything to Network IS. And Network IS — the *Network World* subscriber — defines the future of your company's products and services. Our 150,000 subscribers determine what gets on, and off, their companies' expanding networks. Advertise in *Network World* today and secure your position on the networks of the 90s. Call Thomas J. Wilson today at (800) 622-1108.

* Source of all of the information above is *Network World* Market Information Database, subject to audit.

New Faces

Network World welcomes **David Clarke** as our new Mailroom Assistant. David has an electronics certificate and enjoys tinkering with mechanics in his leisure time.

≈

Jodi Cohen joins *Network World* as a Copy Editor. Jodi is a graduate from University of Wisconsin and holds a BA in journalism and history.

≈

Paula Connor is *Network World's* new sales representative for the Northwest region. Previously, she was a district sales manager for *Upside Magazine.*

≈

Network World welcomes **Lisa Hall** as a District Manager for the San Francisco Bay area. Lisa has been in the publishing industry since 1987 and came to us from *Network Computing.*

≈

Julie Haws is a new sales representative at *Network World.* Julie will be working with Kim Schackel, National Accounts Manager — West Coast, serving the southwest sales territory.

Network World is pleased to add **Ann Lewis** to our Advertising Operations Department. As an Advertising Account Coordinator, Ann will act as the liaison between the sales and production departments.

≈

Network World's San Francisco bureau welcomes **Peter Lisker** as a Senior Editor with the client/server applications team. Previously, Peter has written on a variety of topics for publications including *PC Week, PC Magazine* and *Macintosh Today.*

≈

Stuart Melnitsky joins *Network World* as our new Test & Reviews Editor. In his new position, Stuart will oversee all product review and technology evaluation articles. Most recently, Stuart managed the test lab at *Digital News & Review.*

≈

Network World is pleased to add **Tom Soevyn** to our sales staff as our Manager of Demographic Editions.

≈

Network World welcomes **Barbara Wierzbicki** to our Features Department as our new Buyer's Guide Editor. Previously, Barbara worked at *Computerworld*, where she launched the Product Spotlight section.